A PROGRAM FOR MANAGEMENT
1957 . . . No. 10

NOVEMBER 11, 1957

STEEL
The Metalworking Weekly

A PENTON PUBLICATION

SMALL BUSINESS

Its Place in Our Future

–Page 99

- "D" Process for Steel Castings . . Page 110
- U. S. Mills Feel Steel Imports . . Page 161

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TUBING PERFORMANCE and WORKABILITY BEGIN with the MELTING OF STEEL

Tensile strength, corrosion resistance, resistance to "creep" at elevated temperatures and reaction to heat treatment are only a few of the mechanical and physical characteristics of a steel which are controlled by chemical composition. In addition to analysis, "melting practice" controls such factors as the cleanliness of the steel, its grain size and its hot workability.

Chuck Connor, melter and *Bob Schriner, first helper* are shown making "additions" during the melting of a heat of alloy steel in one of B&W's electric melting furnaces. They know that what they add, and when and how they add it during the melting cycle helps make B&W Seamless Tubing easier for you to fabricate and gives the tubing optimum service life.

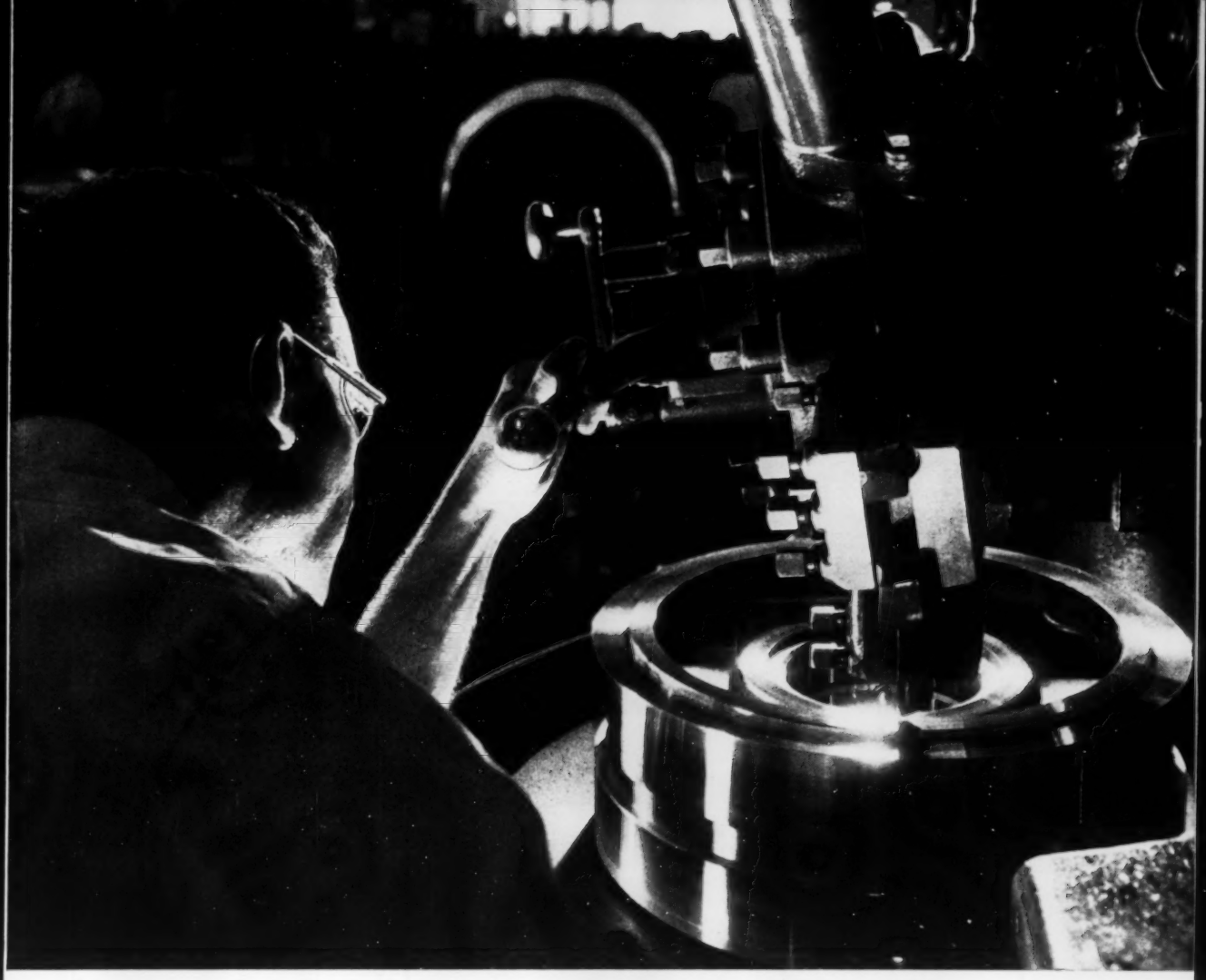
Years of experience and attention to detail and the coordinated efforts of the entire team of B&W technicians, furnace operators, metallurgists, engineers and chemists help make the name "B&W" the hallmark of tubing quality. The Babcock & Wilcox Company, Tubular Products Division, Beaver Falls, Pa.

B&W

TUBULAR PRODUCTS DIVISION

TA 6050-G5

Seamless and welded tubular products, seamless welding fittings and forged steel flanges—in carbon, alloy and stainless steels.



From a Sound Blank Comes a Sound Finished Product

One of the best ways to insure top quality in finished circular products is to insist on sound, reliable blanks. You have this assurance when your specifications call for Bethlehem blanks, which are unsurpassed anywhere.

These sturdy steel pieces are made in a two-way mill that combines the steps of forging and rolling. Blanks produced in this mill have uniformity and good grain flow. They are very strong; hence thinner sections can often be used. And their internal structure is so dependable that machining can be done with confidence. There is no hidden trouble lurking beneath the surface of the metal.

Bethlehem forged-and-rolled blanks are widely used in the making of gears, crane and industrial wheels, sheave wheels, flywheels, brake drums, turbine rotors, pipe flanges, and other circular products. They are available in a wide range of sections, and in sizes from 10 to 46 in. OD. Orders can be furnished heat-treated or untreated.

We suggest you get full details from the nearest Bethlehem office. Or write for a copy of Booklet 216, which contains many interesting facts and more than 80 photographs.

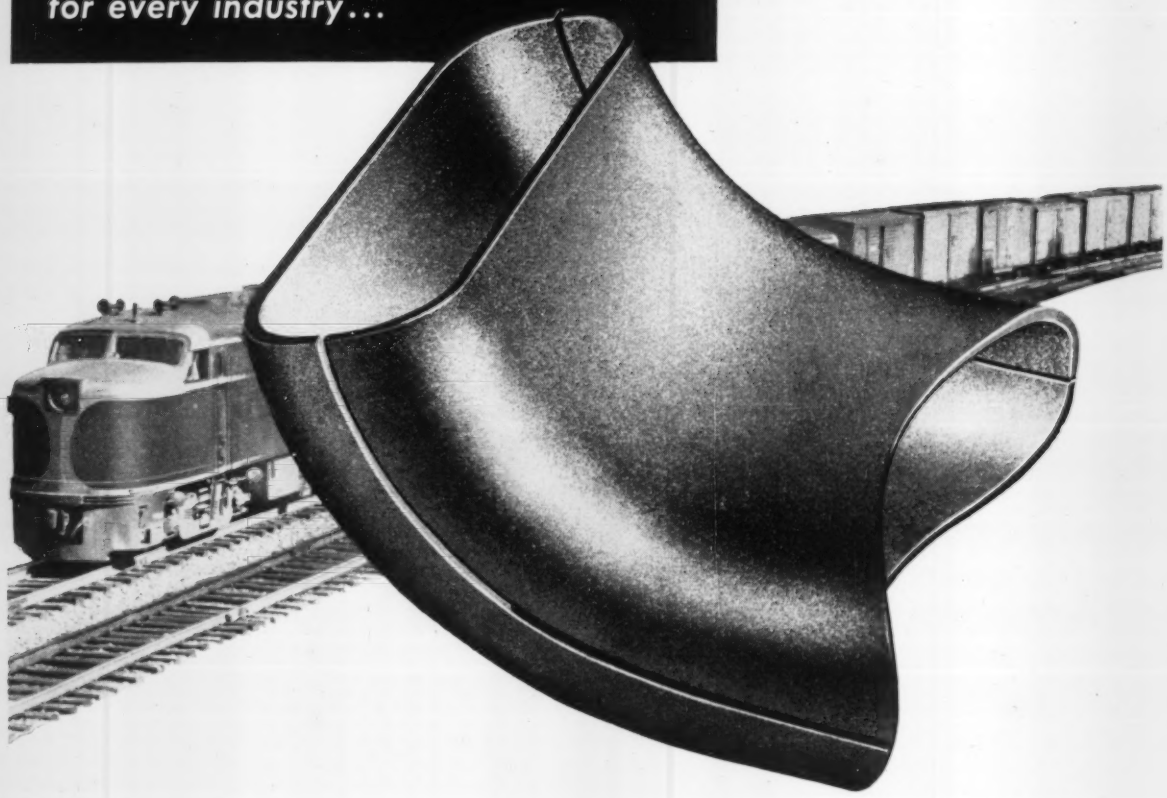
BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation
Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

COMMERCIAL *Custom Stamping*
for every industry...



Cuts material costs 50%!

By making it possible to switch from a forging made from hot rolled tubing at 15 cents a pound, to a stamping made from mild flat steel at 6 cents a pound, Commercial has been able to effect a substantial saving for a leading manufacturer of diesel locomotives.

AN EXHAUST ELBOW TUBE is the part in question. There are 32 of them on each 16-cylinder diesel engine. Commercial makes two open stamping for each elbow, which are welded together automatically. Each half—stamped from 1/4-inch flat steel—is held to rigid tolerances of +0 −1/32. The ends need no trimming either, and fit both the engine block opening and manifold to which they are welded, right on the button. Now, strong, even welds with full penetration are routine.

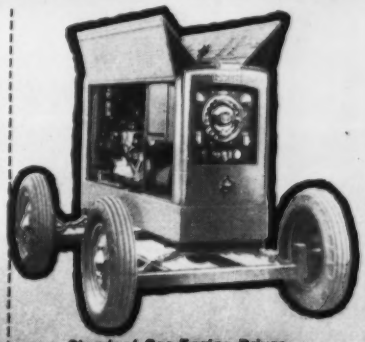
UNUSUAL FORMING PROBLEMS like this one—in every industry—are routine at Commercial. The skill of Commercial engineers, plus Commercial's "die-bank" of over 2300 basic die components, may be just the cost-saving solution you need for your component forming problem. You can make Commercial prove it—without cost or obligation—by simply sending along a blueprint, sketch, or even sample of the part you are now making or plan to make.

Address inquiries or requests for forming engineering assistance to The Commercial Shearing and Stamping Company, Dept. L-46, Youngstown 1, Ohio.

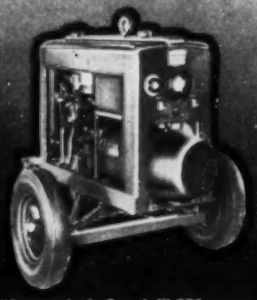
SPECIALISTS IN CUSTOM FORMING THROUGH STAMPING • UPSET FORGING • HYDROSPINNING

COMMERCIAL
shearing and stamping

The "BIG WHEELER" *Weldmobile* — *With this new improved "self-propelled" unit, your welding operator can get to the job on a moment's notice. No waiting for truck or tractor. No waiting for electricians. One engine serves operator's needs for both transportation and welding. A valuable tool that lets you weld anywhere without involving extra help and added cost.*



Standard Gas Engine Drives
300-400-600 amp. sizes

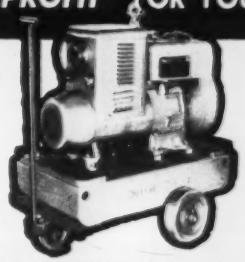


"Contractor's Special" 250 amp.

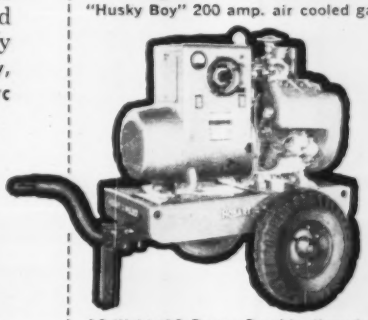
WELD ANYWHERE with these HOBARTS

NEW FEATURES—NEW ADVANTAGES MEAN MORE "ON-THE-JOB-PROFIT" FOR YOU

Special built-in features on all Hobart Welders make them outstanding for top performance and convenience of operation. You have a choice of many types and sizes that lets you select the right welder for your particular work. Saves on maintenance and emergency repair work. Keeps equipment working. Eliminates expensive replacement parts, disassembly and costly delays. Makes construction jobs faster and more profitable. Choose AC or DC or a combination welder and auxiliary power for running tools, lights, motors, etc. Write today for complete information. **HOBART BROTHERS CO., Box ST-117, Troy, Ohio**—or Phone FE-21223. ***"One of the world's largest builders of arc welding equipment."***



"Husky Boy" 200 amp. air cooled gas drive



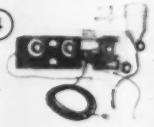
AC Weld /AC Power Combination-air cooled

MOST MODERN MOST COMPLETE LINE OF ARC WELDERS ON THE MARKET

① Electric Drive

② AC/DC Combination

③ DC Rectifier



④ Automatic and Semi-automatic equipment

HOBART TROY OHIO WELDERS

HEAD SHIELDS IN COLOR SPECIAL
At-No-Extra-Cost

Invaluable for personnel or property identification. Reinforced plastic with new moulded type lens holder that eliminates light leaks. Comes in Red—Blue—Green—Yellow—White and standard Grey.

ELECTRODES FOR EVERY WELDING JOB

You can be assured of quality electrodes with Hobart's complete control of manufacturing methods—from basic materials to finished electrodes. Samples offer proof of superiority. Write today, no obligation.

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☐ *Tell me more about a _____ ampere welder.*
☐ *"Self-Propelled"* ☐ *Standard Gas Drive* ☐ *"Contractor's Special"* ☐ *"Husky Boy"* ☐ *AC/AC Combination*
☐ *1* ☐ *2* ☐ *3* ☐ *4* ☐ *Color Head Shields*
☐ *I'd be interested in trying the new Hobart Electrodes.*

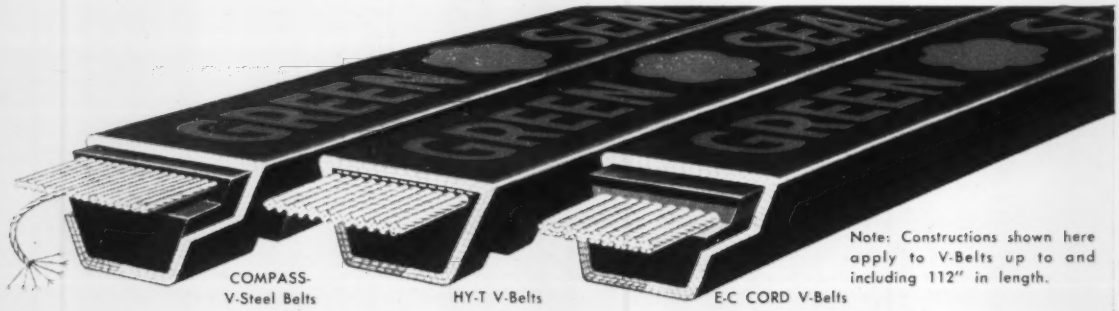
Name _____

Firm _____

Address _____

City _____ *State* _____

What's different about



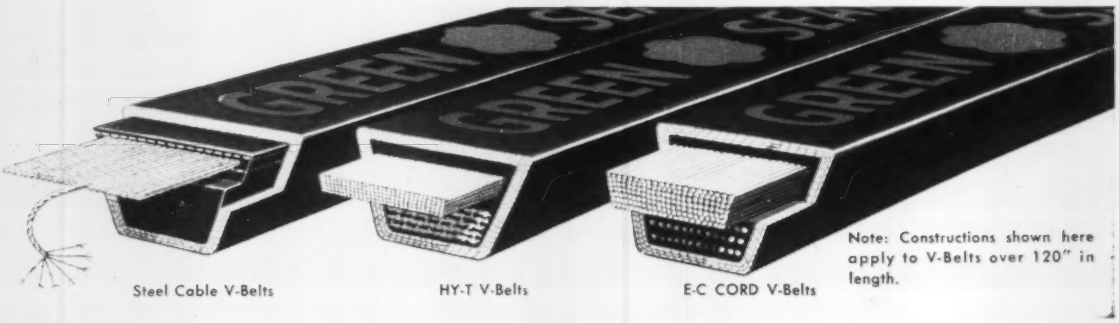
COMPASS-
V-Steel Belts

HY-T V-Belts

E-C CORD V-Belts

Note: Constructions shown here apply to V-Belts up to and including 112" in length.

V-Belts with the Green Seal?



Steel Cable V-Belts

HY-T V-Belts

E-C CORD V-Belts

Note: Constructions shown here apply to V-Belts over 120" in length.

Plenty—when you're belting multiple drives. For that Green Seal certifies the dimensional stability of every belt that carries it. There's no surer guarantee that every belt in a set will match every other one—perfectly. And that they'll *stay* matched no matter how long you stock them before installation.

So the dimensional stability of Green Seal belts is solid protection against "loafing," slipping, stretching, scorching and other mismatching troubles. And most of the credit belongs to the belts' load carriers of airplane-type steel cables or Triple-Tempered (3-T) cord — Goodyear "exclusive" cord that's carefully tempered with Tension, Temperature and Time.

This unique 3-T process brings the synthetic cord to its point of greatest strength and stability. Result: the end of shrinkage in storage—plus greatest shock- and stretch-resistance in use. All of which assures you maximum, trouble-free horsepower hours at minimum cost. Why settle for less?

DIMENSIONALLY STABLE V-BELTS with the GREEN SEAL by

GOODYEAR

THE GREATEST NAME IN RUBBER

The Goodyear Tire & Rubber Company, Dept. 794, Akron 16, Ohio

Please send me complete information on what makes V-Belts with the Green Seal different from any others made today.

Name_____

Company_____

Street Address_____

City_____ Zone_____ State_____

Compass, E-C Cord, Hy-T, Green Seal—T. M.'s The Goodyear Tire & Rubber Company, Akron, Ohio

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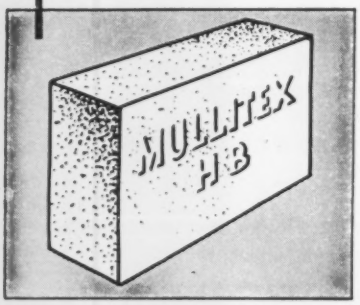
Walsh Points the Way... TOWARD A NEW HORIZON in REFRACTORY Performance

AN OPEN LETTER TO THE STEEL INDUSTRY

...consistent with refractory quality, Walsh is constantly striving to produce fire brick of higher bulk density and lower porosity. To you this is assurance of greater dollar value when you purchase refractories by Walsh.

Specialists in fire brick of high bulk density and low porosity.



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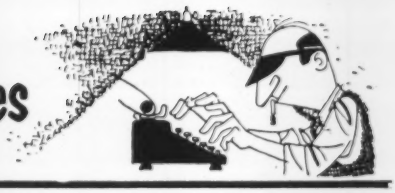
FOR OVER 60 YEARS MANUFACTURERS OF HIGH GRADE REFRACTORIES

behind the scenes



Distant Drums

Most of them were young men. They were not particularly interested in politics, or dynasties, or the balance of power. Generally, they resented authority, and cursed confusion, and complained endlessly. Usually they were dirty, and the odor that hung about them could never be confused with My Sin. When they weren't terribly frightened, they were terribly bored. Much of the time they talked about women, and home, and family meals. Sometimes they argued over the rights and responsibilities of governments, but more often than not they damned all politicians. Exposed to all the malignancies of weather in all climates and in all seasons, they qualified as experts on sunstroke, frostbite, drought, floods, and whirlwinds. They were exposed to other things, too: Fear, and disease, and the dread of death. Yes, most of these men were fundamentally reluctant, but when they accepted the authority of their government, they accepted it to the extent that they dared to surrender life itself. Perhaps not one in a million subscribed to the belief that it was sweet and lovely to die for one's country, but the solemn fact remains that multitudes did. Thinking along these lines proves nothing and reveals nothing, except that today is Veterans' Day, and if what this day stands for doesn't make you think, nothing will.

Small Business Is Big Stuff

STEEL's Program for Management article this week (Page 99) is the last in the 1957 series. Like the stainless steel report last week (STEEL, Nov. 4, p. 107), "Small Business—Its Place in Our Future" is a community effort . . . a community of STEEL staffers, that is. In its final shape, the article is an objective report, but it also contains advice and suggestions for the small businessman. For instance, there are items on taxes, business restrictions, contracts, and detour signs around pitfalls.

In a sneak preview of this article, we learned that small business has just about doubled since 1946. That's an interesting fact to sling in the teeth of business blues singers. Another interesting item is the volume of business done by small metalworking firms each year. It amounts to $47 billion! The corollary to this, of course, is: If small business does this much, and is called "small," what in the world is "big business"?

Call Backfires

Glenn W. Dietrich, STEEL's quick-eyed associate copy editor, relayed this story to us. Because Glenn sits on the fence, so to speak, with his ear to the ground, so to speak, he is in an excellent position to observe what is going on inside and outside the editorial coops. One day recently, while he was engaged in a spirited debate with himself concerning the pros and cons of placing exclamation marks inside or outside quotation marks, he chanced to overhear one side of a telephone conversation. The call, apparently, was placed with an executive, requesting a prognosis of business conditions. "Yes, sir, your opinion would be helpful. You say you'll get the information for me at once? Thank you—what's that? Pardon me, I didn't quite catch what you said. You'll what?" After a short silence, Dietrich heard a muffled exclamation, a telephone click, and a remark addressed in wondering tones to nobody in particular: "He says to wait a minute, that he'll read me his answer from 'The Business Trend' in STEEL!"

Sputnik Flips

After you part the whiskers, you'll discover that this is another oldie. Francis Sputnik, an old poker player, was unhappy to find that his new license plate had five numerals, not in sequence, and all different. Still sputtering (probably beep, beep) he absently screwed the plate on upside down, with the result that he increased his registration number by 78,633. What was the number on Francis Sputnik's license plate?

Shrdlu

(Metalworking Outlook—Page 53)

This alloy "shopping list" saves many a day for busy metallurgists!

AISI		AMS			SAE	
302	410	5333	5376	5631	30302	51442
303	414	5334	5378	5640	30303	51446
304	416	5350	5380	5643	30303F	60303A
308	420	5351	5382	5645	30304	60304
309	430	5352	5385	5665	30310	60310
309+W	430F	5354	5386	5700	30316	60316
310	431	5355	5388	5710	30321	60347
316	431A	5358	5389	5735	30347	60410
321	436	5360	5392	5765	51410	60420
327	440A	5361	5393	6270F	51414	60442
329	440B	5362	5394	6274F	51416F	60446
330	440C	5363	5526	6280C	51420	70310
331	440F	5366	5537	6350	51430	70310A
347	442	5369	5610E	6382	51431	70327
403	446	5370	5616	6428	51440A	70330
406		5372	5621	7834	51440B	70331
		5373	5628		51440C	70446
		5375	5630		51440F	

MISCELLANEOUS

Armco 17-4PH • GMR 235 • Inconel* • Invar • Monel* • NiResist* 1A NiResist* IIA • NiResist* III • Waspalloy

*® International Nickel Co.

You name the alloy... we'll produce to your specs. —in record time!

THE watchword of CANNON-MUSKEGON is "CONTROL." Careful selection of the finest raw materials . . . rigid melting procedures . . . complete chemical and physical testing facilities, plus closely supervised handling — produce alloys to your most exacting standards. More than 100 special and standard alloy analyses are produced each year.

The alloy list above is typical of production "regulars" for scores of users in all industrial fields. If you don't see what you need — remember, our facilities are open to "tailor" alloys to your specific needs. We'll also recommend proper in-plant handling and heat treating procedures to assure the desired physical and chemical properties in your final product.

FOR IMMEDIATE REFERENCE — write for your personal copy of Cannon-Muskegon's 6-page handbook for metallurgists, giving you data on both UltraMet and MasterMet alloy service.

ULTRA MET — VACUUM-MELTED ALLOYS FOR INDUSTRY

MASTER MET — CERTIFIED ALLOYS FOR INDUSTRY

and CANNON-MUSKEGON offers you both vacuum and air-melting facilities for cobalt-, ferrous- and nickel-base alloys in a wide variety of cast forms

UltraMet alloys are produced in this latest design vacuum melting furnace — production center for a virtually unlimited variety of high temperature, corrosion resistant alloys for severe-stress applications.

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METALLURGICAL SPECIALISTS

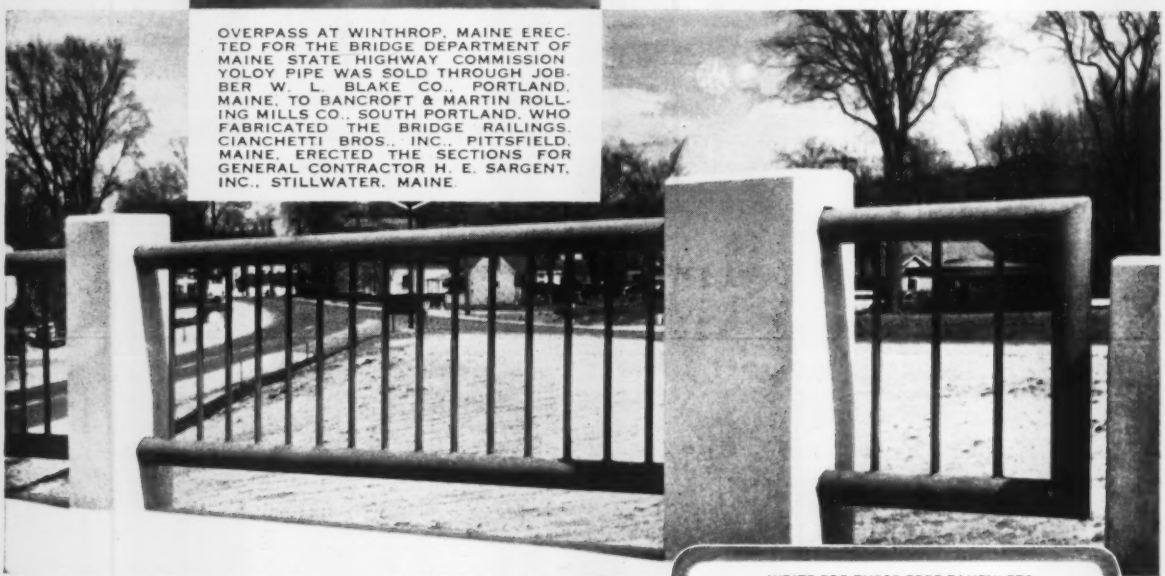
This beautiful, new overpass erected at Winthrop, Maine has sidewalk railings made of Continuous Weld Yoloy Steel Pipe. Yoloy's extra strength and excellent corrosion-resistance are qualities required for applications of this type.

"Yoloy" pipe is on the job

. . . providing strong, corrosion-resistant bridge railings for Maine State Highway Commission

Maine chose Yoloy! It proved so easy to fabricate and weld that 2 additional Maine bridges will have Yoloy railings. This nickel-copper alloy steel also demonstrates added strength and longer life making it an ideal structural pipe!

Available in Sheets, Plates, Bars, Shapes, Cold Drawn Bars and Tubular Products, Youngstown's complete family of Yoloy steels provides the right grade for each of your specific jobs. Complete informative Data Sheets on each Yoloy steel will be sent you promptly upon request.



OVERPASS AT WINTHROP, MAINE ERECTED FOR THE BRIDGE DEPARTMENT OF MAINE STATE HIGHWAY COMMISSION. YOLOY PIPE WAS SOLD THROUGH JOBBER W. L. BLAKE CO., PORTLAND, MAINE, TO BANCROFT & MARTIN ROLLING MILLS CO., SOUTH PORTLAND, WHO FABRICATED THE BRIDGE RAILINGS. CIANCHETTI BROS., INC., PITTSFIELD, MAINE, ERECTED THE SECTIONS FOR GENERAL CONTRACTOR H. E. SARGENT, INC., STILLWATER, MAINE.

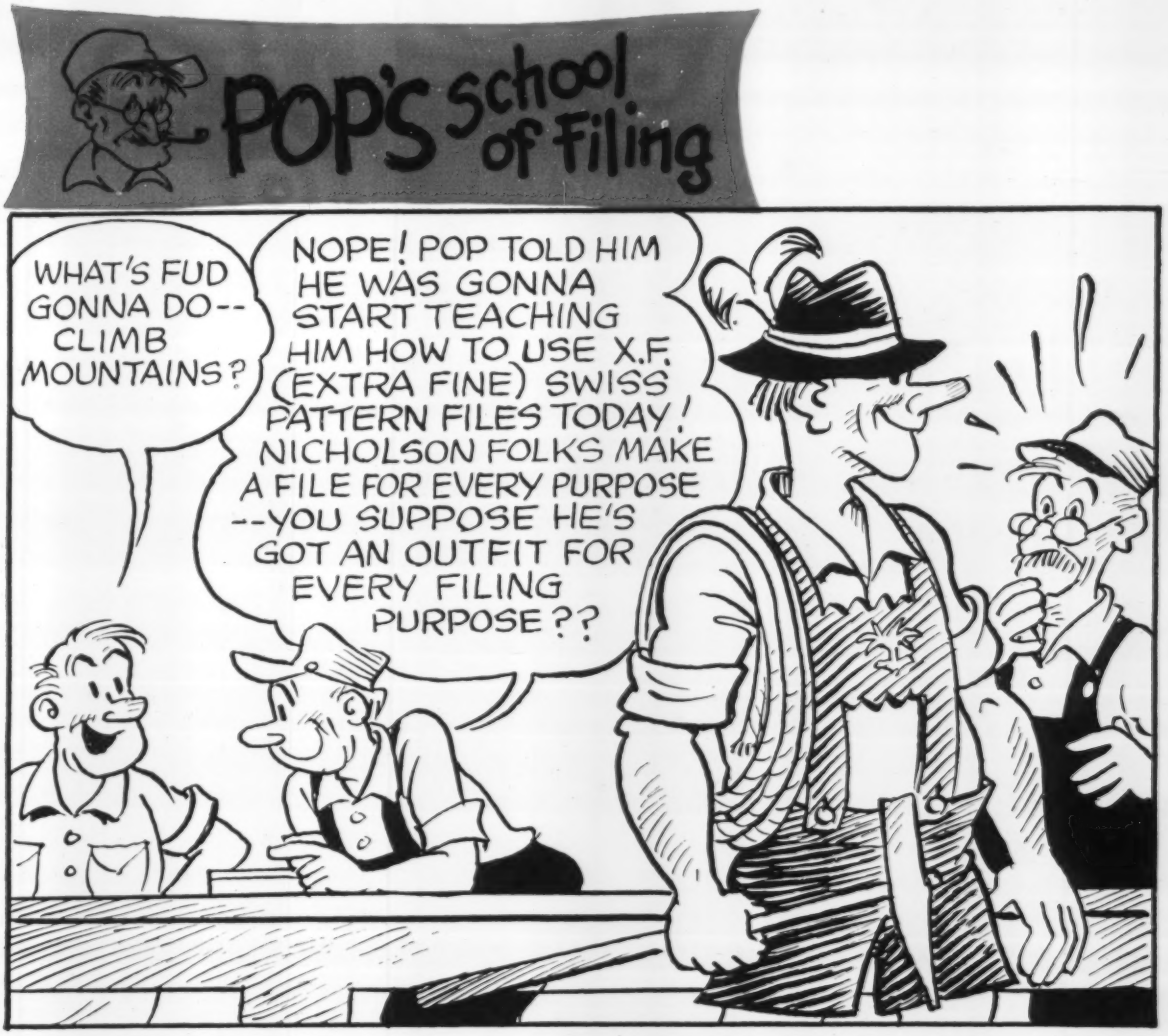
PHOTOS COURTESY OF MAINE STATE HIGHWAY COMMISSION

THE YOUNGSTOWN SHEET AND TUBE COMPANY
Manufacturers of Carbon, Alloy and Yoloy Steel
General Offices - Youngstown 1, Ohio
District Sales Offices in Principal Cities

QUALITY YOUNGSTOWN SERVICE

WRITE FOR THESE FREE PAMPHLETS IN THE YOLOY FAMILY SERIES.

YOLOY "E"	HIGH STRENGTH-LOW ALLOY STEEL-STANDARD APPLICATIONS
YOLOY	HIGH STRENGTH STEEL-SPECIAL APPLICATIONS
YOLOY "S"	HIGHER STRENGTH STEEL FOR INCREASED SERVICE LIFE
YOLOY "C"	CORROSION RESISTANT GRADE FOR DEEP FORMING
YOLOY PIPE	CONTINUOUS WELD FOR CORROSION RESISTANT APPLICATIONS


POP'S school of Filing
WHAT'S FUD GONNA DO-- CLIMB MOUNTAINS?
NOPE! POP TOLD HIM HE WAS GONNA START TEACHING HIM HOW TO USE X.F. (EXTRA FINE) SWISS PATTERN FILES TODAY! NICHOLSON FOLKS MAKE A FILE FOR EVERY PURPOSE --YOU SUPPOSE HE'S GOT AN OUTFIT FOR EVERY FILING PURPOSE??

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HERR EQUIPMENT

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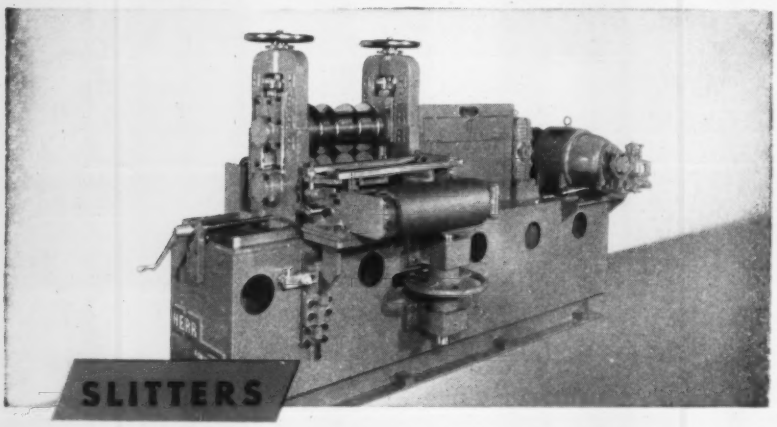

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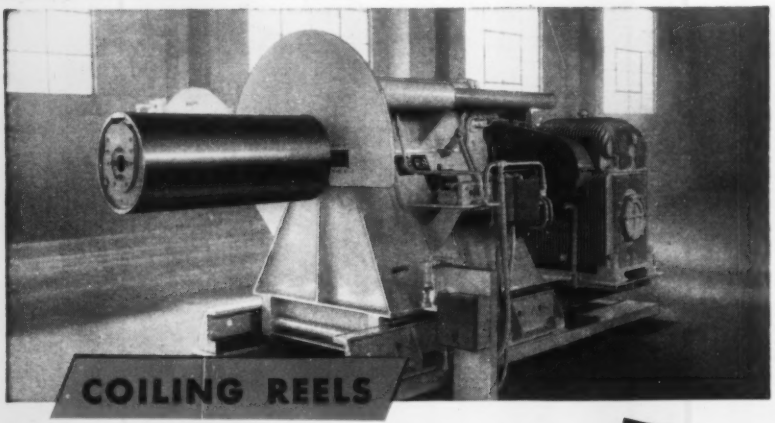
Built to insure dependable, high precision slitting. All thicknesses from .001 to ⅛", any commercial width. Quick, extremely accurate knife set-up. Also complete high precision slitting lines including pay-off reel, leveler, slitter, scrap winder, scrap chopper and coiling reel.



COILING REELS

Wide variety of types and sizes for coiling ferrous and non-ferrous strip. Fixed, adjustable or automatically aligning bases. Automatic oscillating level winding drive if desired. Link type contracting mandrels; manually or hydraulically operated. Furnished complete ready for use.

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LETTERS TO THE EDITORS

Lauds Vivid Article

Allow me to congratulate you upon your interesting and vivid article, "Dealing with Workers" (Sept. 16, Page 119). May I have three reprints?

I look forward to reading your Program for Management series articles.

Dr. A. T. Yu
Chief Design Engineer
Robins Engineers Div.
Hewitt-Robins Inc.
New York

Please arrange to send me 1200 reprints of this article. We intend to mail them to our supervisors.

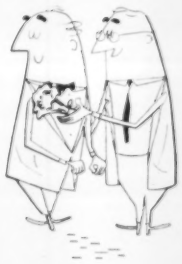
Bennett E. Kline
Director
Management Development & Training
Indiana Harbor Works
Inland Steel Co.
East Chicago, Ind.

Requests Brazing Selector

Please forward a copy of the article, "Brazing Alloy Selector," (Oct. 7, Page 162), which is particularly interesting to me. It will be a valuable addition to our files.

J. F. Brownell
Product Design Engineer
Distribution Transformer Dept.
General Electric Co.
Oakland, Calif.

Bouquet for Editorial



An orchid and a pat on the back to you for your hard-hitting editorial, "Needed: A Pricing Policy" (Sept. 30, Page 43).

We were particularly impressed by your statement on the motivation of pricing decisions for the purpose of increasing sales. To that statement, we heartily subscribe. It could spell ruin.

Arthur T. Dalton
Vice President
Chicago Wheel & Mfg. Co.
Chicago

Information for Files

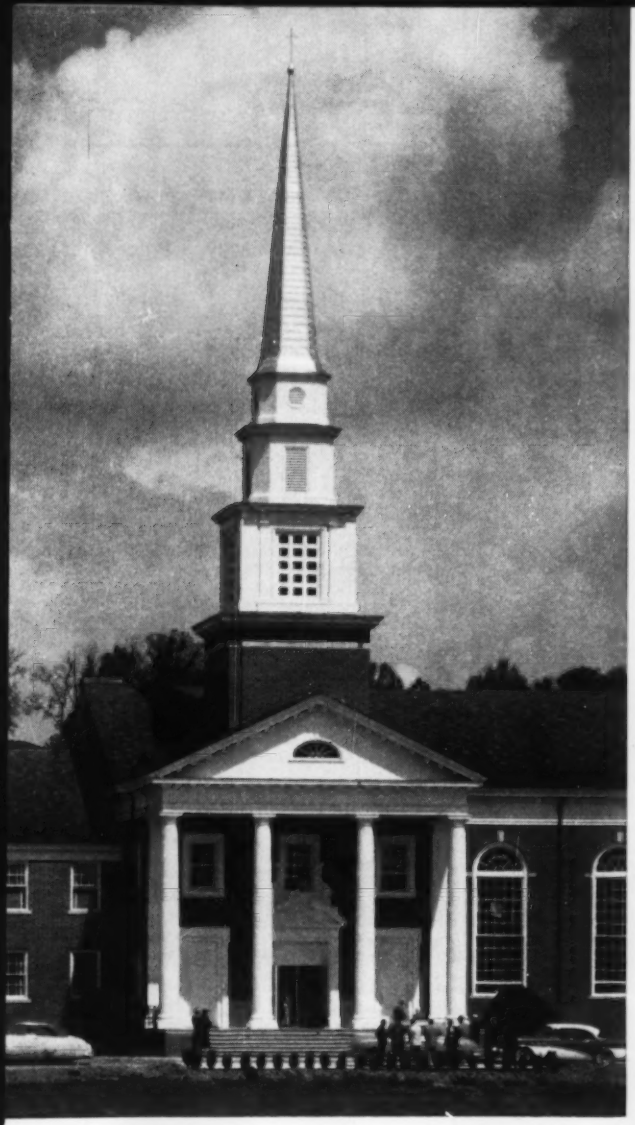
Please send six copies of the article, "Choose the Right Lubricant" (Oct. 14, Page 132). We found it to be informative and would like six copies for our file.

Beverley Schwendiman
Metallurgical Service
Steel Co. of Canada Ltd.
Hamilton, Ont.

Parable in Newspaper

One of our readers mailed me a copy of your excellent editorial, "Parable of the Prices" (July 15, Page 51), sug-

(Please turn to Page 12)



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PIPE • TUBES • WIRE • SPECIAL SECTIONS

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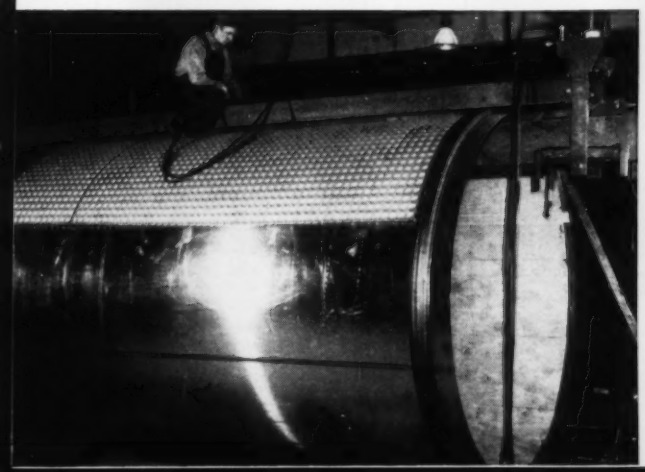
◀ **FOR BEAUTY.** Stainless Steel shingles in diminishing sizes create a beautiful, gleaming steeple for the State Street Methodist Church in Bristol, Virginia. Architect Allen Dryden, of Kingsport, Tenn., specifies Stainless Steel for jobs like this to assure lasting beauty, protection from weather and freedom from maintenance. This spire is sheathed in Type 302 26-gage Stainless Steel, and the cross is built of Type 302 Stainless bars. Construction details were engineered by Overly Manufacturing Company, Greensburg, Pa., who also fabricated and erected the steeple.

FOR FLEXIBILITY OF DESIGN. In this "Cold-Zone" cooling-storage milk products tank, made by Damrow Brothers Company, Fond du Lac, Wisc., Type 304 10-gage Stainless Steel was used for the smooth, easy-to-clean inner wall. Again Stainless Steel—this time Type 304 16-gage—was used for the dimpled outer wall which is stave-welded to the inner shell. This unusual design of dimple size and arrangement gives proper baffling and velocity to the refrigerant as it passes through the cooling area. Stainless Steel provides greater sanitation, durability, long life, strength and—the flexibility necessary to make this design possible.

FOR DURABILITY. The Master Combination Padlock, designed for school locker room use and built by Master Lock Company, Milwaukee, Wisconsin, features a double-case construction—with Type 430 Stainless Steel used for the outer case. This Stainless Steel design makes it one of the strongest padlocks available. In addition to increasing the lock's durability, Stainless Steel also adds to its sales appeal and to its resistance to the corrosive atmospheres of damp locker rooms. The springs, too, are made from USS Stainless Steel—Type 304 Ameroxide coated wire.



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This country-wide organization of local dealers offers immediate delivery on many CHICAGO *induction hardened* press brake dies. These stock dies are economical, and the quick delivery saves time in tooling. They are available in any length from 4 to 12 feet in increments of 2 feet.

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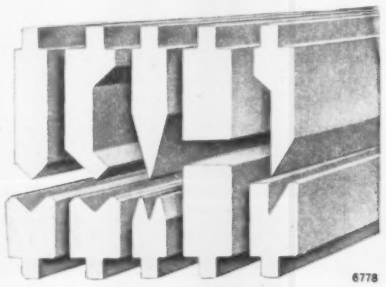
On your needs for press brake dies, call your nearest dealer listed here. With Bulletin D-455 you can order by number. Ask for copy.



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7458 South Loomis Boulevard, Chicago 36, Illinois

LETTERS

(Concluded from Page 10)

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Frank C. Marron
Editor
NAM News
National Association of Manufacturers
New York

• *Permission granted.*

Decision-Influencing Article

We have read with a great deal of interest the ninth article in your 1957 Program for Management, "Make or Buy?" (Oct. 14, Page 105). We feel that this well-written piece will be of help to us in reaching a "make or buy" decision. Please send five copies.

M. L. Cowan
Materiel Manager
Librascope Inc.
Glendale, Calif.

We have noted this interesting article and would like to distribute it within our organization. We would appreciate six reprints.

E. G. Althoff
Assistant Director of Purchases
Frigidaire Div.
General Motors Corp.
Dayton, Ohio

We would like to have 30 copies.

Lewis Turner
Vice President
Dollin Corp.
Irvington, N. J.

Beneficial to Work

I believe your article, "Look What's Happening to Honeycombs" (Oct. 14, Page 116), would be beneficial in our work. Please send four copies.

V. D. Sanford
Manufacturing Development
Dept. 79
Columbus Div.
North American Aviation Inc.
Columbus, Ohio

I have read this article with interest, and I would like to request two reprints.

D. E. Wernz
Assistant Supervisor
Mfg. Research & Development
Martin Co.
Baltimore

Appreciates Help

Please send a copy of your article, "How To Be a Better Boss" (Sept. 23, Page 90). I appreciate your help and thank you for making these extra copies available.

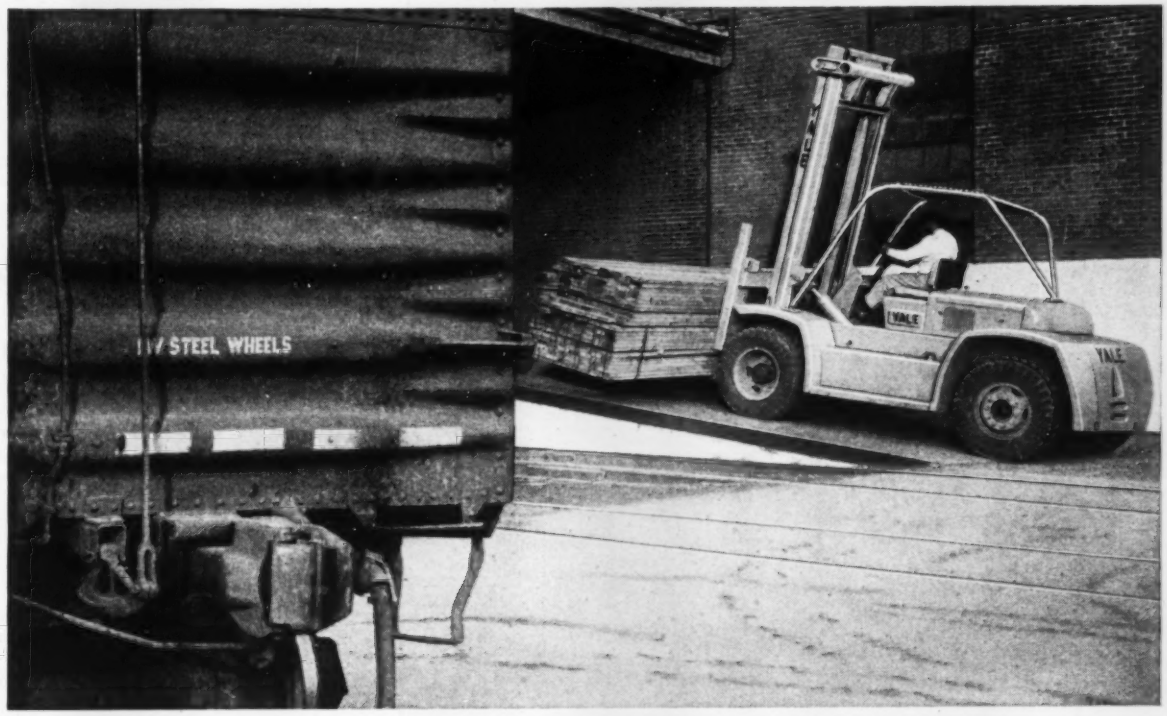
G. A. DeWyer
Ivanhoe Div. Engineering
Reliance Electric & Engineering Co.
Cleveland

Price Rise of Interest

I found your article, "Why Prices Rise" (Sept. 30, Page 45), particularly interesting. We would appreciate several copies.

E. H. Burk
Vice President-Mfg.
Sterling Radiator Co. Inc.
Westfield, Mass.

NOW! YALE G-3 GAS TRUCKS...



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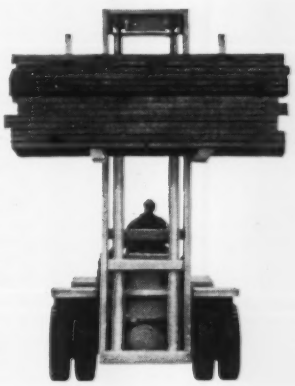

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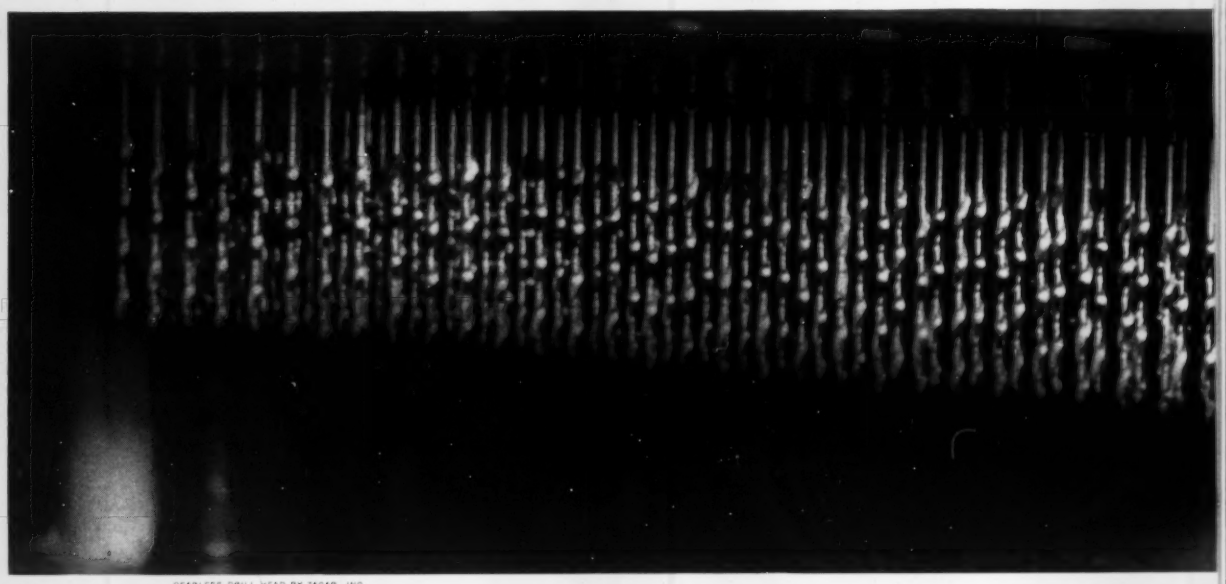

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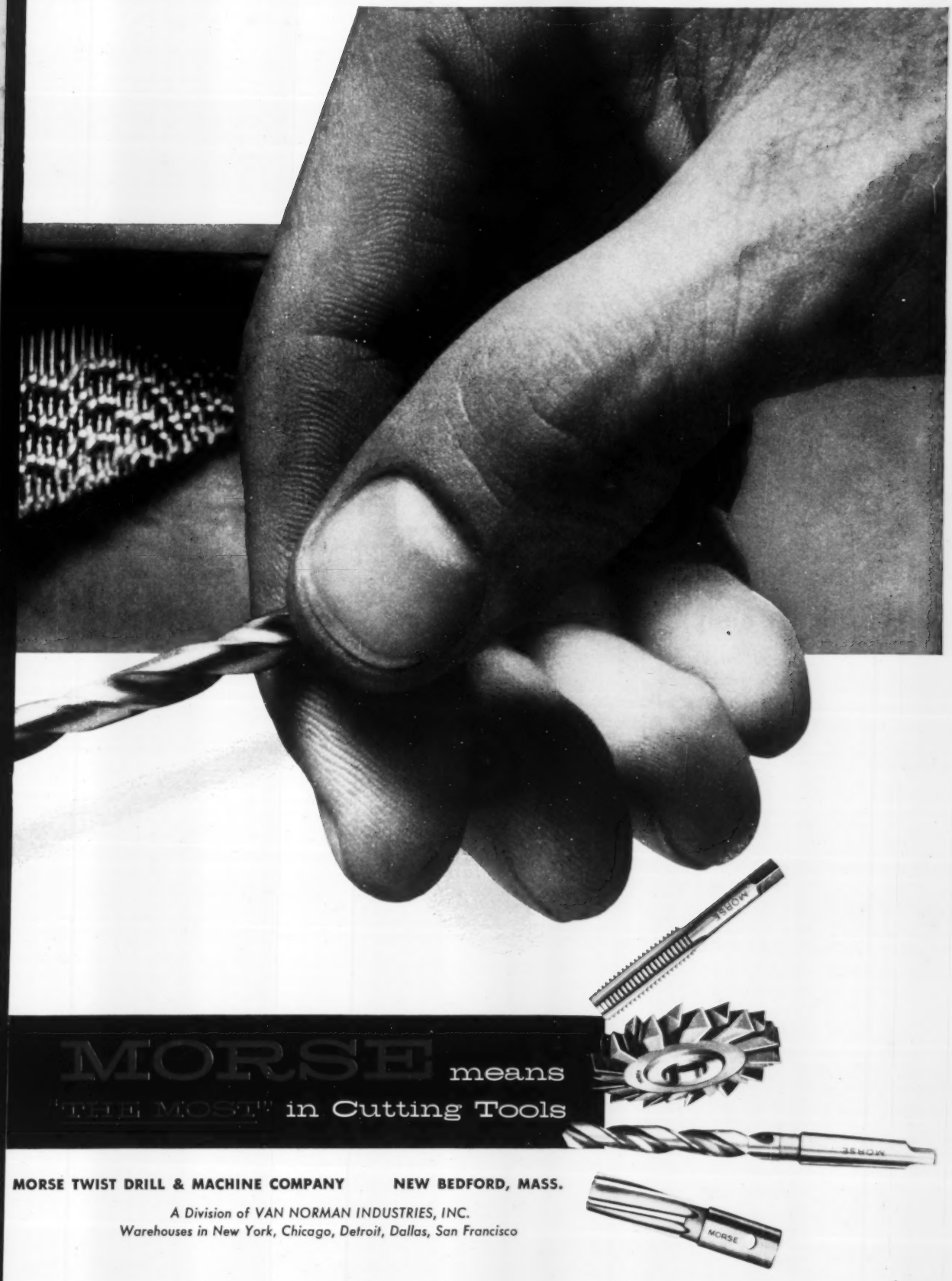

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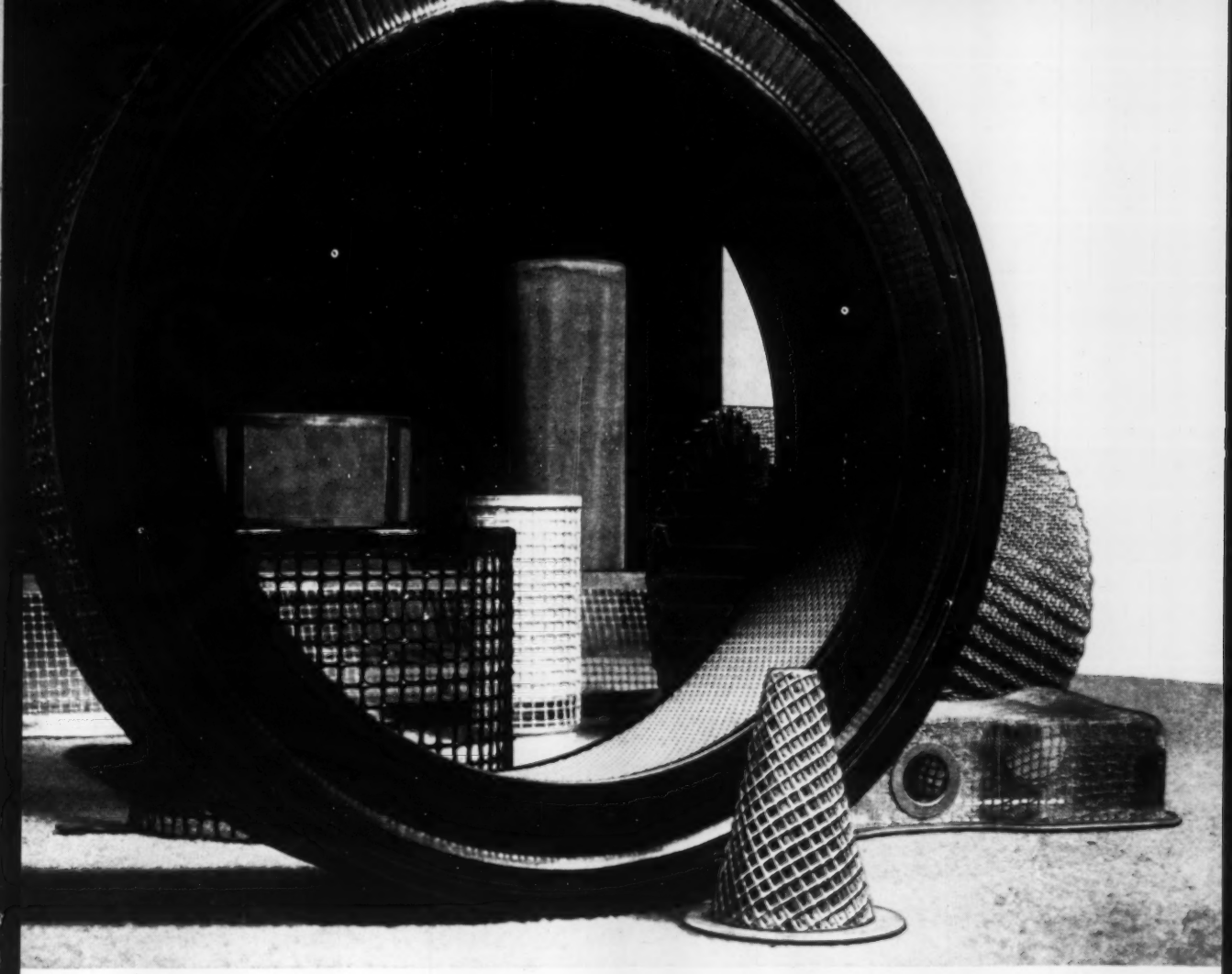

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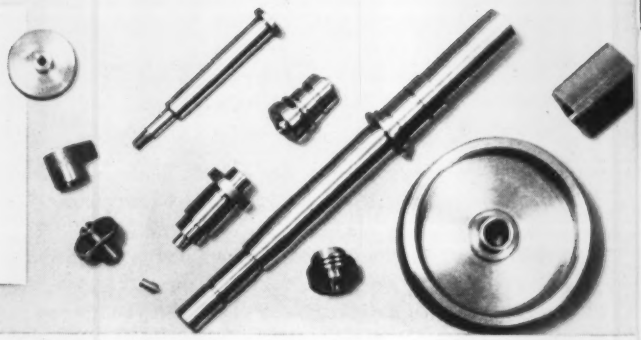

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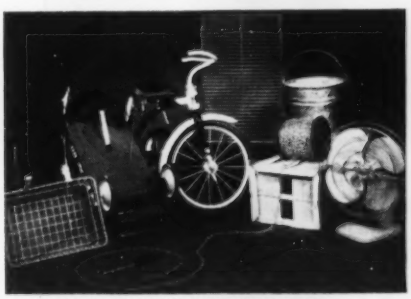
Republic Cold Finished Steel has been helping National Cash Registers ring up sales for more than a half century. Ever since the Union Drawn Steel Company, now our Union Drawn Steel Division, pioneered the cold drawing process, National Cash Register products have totaled enviable service records backed by the uniform excellence of Republic Union Drawn Carbon and Alloy Steel components.

You, too, can capitalize on the many outstanding advantages of Republic Cold Finished Steel. For example, in comparison with hot rolled bars, you get maximum machinability. This feature alone makes possible higher speeds and feeds, finer finished surfaces and longer tool life.

In addition your parts will have higher ultimate strength, yield point and hardness when you use Republic Cold Finished Steel. Extreme accuracy in size and cross section plus an as-received bright, smooth finish enable you to eliminate all further finishing for many applications.

Join the growing list of users scoring production gains through the use of Republic Cold Finished Steel. Contact your Republic representative or your Republic Union Drawn Distributor. Or mail the coupon for full details.

HEAVY-DUTY PERFORMANCE plus minimum weight are provided by these gear train-components made of modern, flight-weight alloy steels. Republic, world's largest producer of alloy steels, can help you determine the precise analysis best suited to your application. Result: A superior product combining strength, toughness, and durability — plus production economy.



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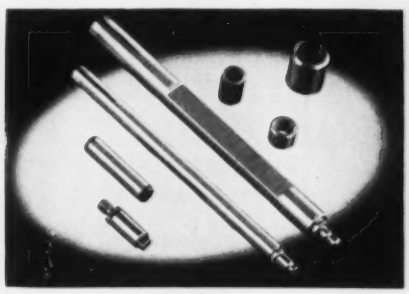

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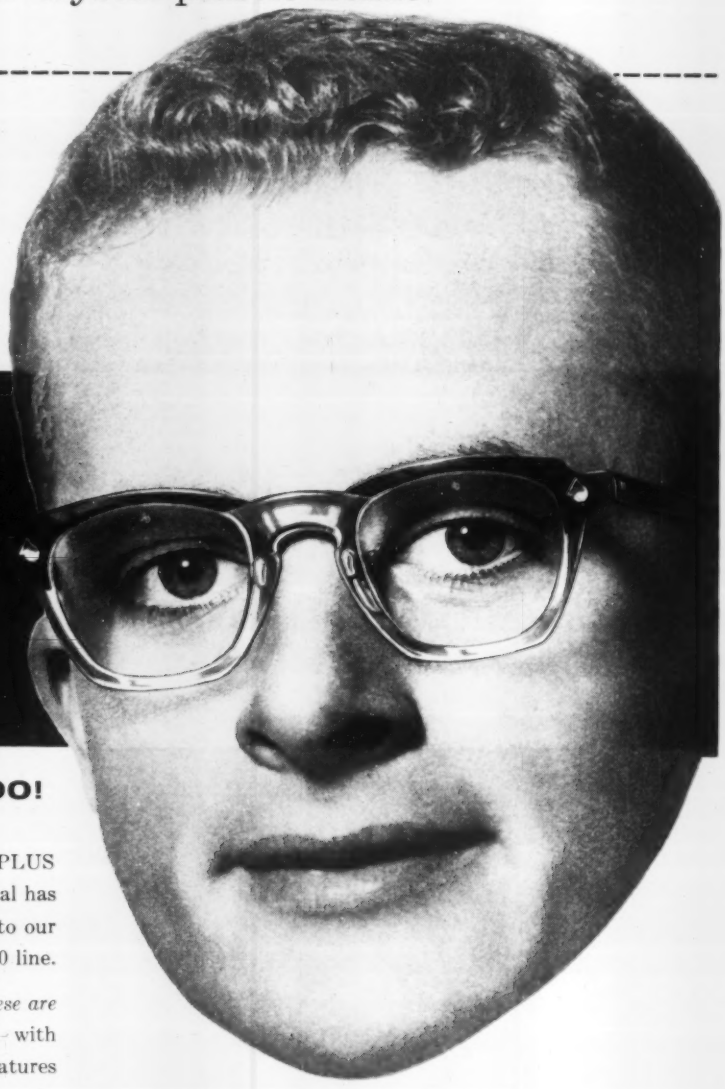
You never had it so

SAFE



AND ATTRACTIVE, TOO!

The true safety of a *safety frame* PLUS smart good looks! American Optical has combined *both* in this latest addition to our Ultrascopic F9500 line.

We cannot overemphasize that *these are true safety frames in every respect* — with all the quality engineering and design features — backed by over 100 years' experience in making optical equipment. By "true safety" we mean that frames, eyewire and lenses are designed and fabricated to give maximum protection. The AO plaque on the frame front is your guarantee that it is a true safety frame.

The American Optical 2-tone Ultrascopic has matching spatula temples and is available with 6 Curve Super Armorplate clear, medium Calobar, dark Calobar and extra dark Calobar lenses. It is also available with clear Plastolite lenses.

Give your workers the SAFEST, the SMARTEST, the FINEST. Complete details in our new Brochure No. S-6761, just off the press.

Always insist on the AO Trademark on lenses and frames.

American Optical
COMPANY
SAFETY PRODUCTS DIVISION

SOUTHBRIDGE, MASS. • *Branches in Principal Cities*

ACCO for Better Values

SPEEDY SLING SERVICE with ENGINEERED SAFETY!

ACCOLOY® KUPLEX SLING CHAINS

Quick Service from Distributor's Stock!

• Your nearby ACCO Authorized Sling Chain Distributor now offers a new sling service that saves time and money for you. This is made possible by American Chain's sensational, newly-designed **ACCOLOY KUPLEX Sling Chains.**

SAFE, STRONG, STREAMLINED

These slings are the *latest and greatest development* in sling chains. All parts in each leg are manufactured *exclusively* by American Chain, of the same alloy, and engineered to be as strong as the chain itself. They are of a streamlined design that reduces the possibility of catching or snagging.

Finally the component parts are factory proof-tested to twice the working load limits—your assurance of maximum strength and safety.

Another valuable feature: all parts remain visible for easy, periodic wear inspection.

TWO STYLES—SIX SIZES

The new ACCOLOY KUPLEX Sling Chains are available in single-leg and two-leg styles and in six chain sizes, from ¼" through ⅞". All chain is made of Accoloy 125 material. All component parts of each assembly are marked and easily identified as to the size of chain with which they are to be used. Components are *color-marked in* orange for easy identification.

CERTIFICATE OF TEST, issued by ACCO and signed by your Authorized Distributor, is furnished with each sling shipment.

GET THE COMPLETE STORY

You will find it to your advantage to learn the full story of ACCOLOY KUPLEX Sling Chains—how easy they are to assemble and disassemble . . . how promptly and easily they can be serviced . . . and how you can benefit from this Great New Distributor Service and this Great New Sling Chain. Write for **Folder DH-54** and name of nearest ACCO Authorized Sling Chain Distributor.

Accoloy Shaped Master Link holds its form under loads up to 18% greater than standard round-section link can

Accoloy Kupler is engineered for maximum strength, safety, simplicity and efficiency; Magnaflux-tested

Accoloy X-weld* 125 Chain in ¼" through ⅝" sizes; **ACCOLOY Endweldur Chain** in ⅞" size

*Patent 2,763,768

The new Accoloy KUPLEX Hook—streamlined in design—is proof-tested and Magnaflux-tested before shipment from factory

All components
PROOF-TESTED and COLOR-MARKED for easy identification

American Chain Division
AMERICAN CHAIN & CABLE
Bridgeport, Conn. • Factories: *York and *Braddock, Pa.

Sales Offices: *Atlanta, Boston, *Chicago, *Denver, Detroit, *Houston, *Los Angeles, New York, Philadelphia, Pittsburgh, *Portland, Ore., *San Francisco

Indicates Warehouse Stocks

ACCO TRADE MARK

Announcing

THE TOTALLY-NEW LINE OF "BUFFALO" NO. 15 DRILLING MACHINES

The completely new design of the No. 15 drill achieves an all-time high in operational ease, with these many important advances:

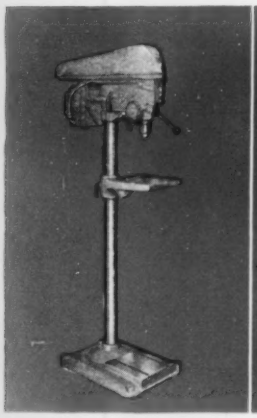
- **Front-Mounted "Start-Stop" Push Button Switch**
- **Easy-to-Read Speed Range Table**
- **Depth Gauge Graduated for Easy Setting**
- **Conveniently-Placed 3-Grip Spindle Feed**
- **Belt Guard Quickly Tilts Upward to Simplify Speed Changes**
- **Hinged Motor Bracket Permits Step-to-Step Belt Changing On the Pulleys Without Tools**
- **Proper Belt Tension Is Automatically Maintained**
- **No Tools Needed for Head or Table Adjustments**

"Buffalo" No. 15 Heavy-Duty Bench Drill

Newly-designed No. 15 bench and floor bases eliminate grease- and dirt-catching troughs and pockets around working area. Extremely sensitive for small hole drilling, these new machines are sufficiently rigid and heavy to operate at full capacity without strain or wear

For a demonstration of the versatile new No. 15 Drill, contact your nearby "Buffalo" machine tool dealer. Or, for complete details, write us direct for Bulletin 4024.

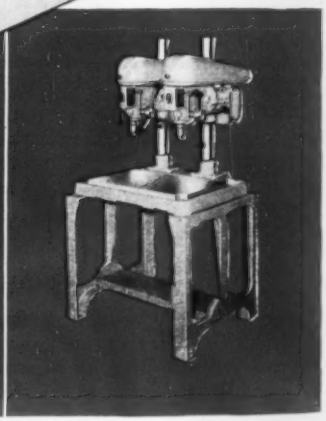
All "Buffalo" products feature the famous "Q" factor — the built-in Quality which provides trouble-free satisfaction and long life.



No. 15 Heavy-Duty Floor Drill

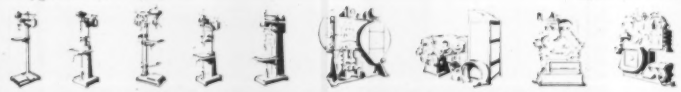
No. 15 Pedestal Type Drill

The new "Buffalo" No. 15 line includes bench, floor and pedestal models (bench and pedestal types in 1- to 6-spindle models). Attachments are available for tapping, mortising, routing or spot-facing.



No. 15 Multiple Spindle Bench Drill

ESTABLISHED 1877 "Buffalo" MEMBER N.M.T.B.A.



BUFFALO FORGE COMPANY

158 MORTIMER STREET, BUFFALO, N. Y.

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

DRILLING PUNCHING SHEARING BENDING

CALENDAR
OF MEETINGS

Nov. 11-13, Steel Founders' Society of America: Technical and operating conference, Carter Hotel, Cleveland. Society's address: 606 Terminal Tower, Cleveland 13, Ohio. Secretary: George K. Dreher.

Nov. 11-15, National Electrical Manufacturers Association: Annual meeting, Traymore Hotel, Atlantic City, N. J. Association's address: 155 E. 44th St., New York 17, N. Y. Managing director: Joseph F. Miller.

Nov. 13-15, American Standards Association: Annual meeting and conference on standards, St. Francis Hotel, San Francisco. Association's address: 70 E. 45th St., New York 17, N. Y. Managing director: G. F. Hussey.

Nov. 14-15, Western Reinforcing Steel Fabricators Association: Fall conference, Del Monte Lodge, Pebble Beach, Calif. Association's address: 1322 Webster St., Oakland, Calif. Manager: F. S. Clough.

Nov. 14-15, Systems and Procedures Association: Basic iron and steel industry committee meeting on customer invoicing problems, Gateway Plaza, Pittsburgh. Association's address: 4463 Penobscot Bldg., Detroit 26, Mich. Executive secretary: Dar Tisdale.

Nov. 18-21, Air Conditioning & Refrigeration Exposition, International Amphitheatre, Chicago. Information: Clapp & Poliak, Inc., 341 Madison Ave., New York 17, N. Y.

Nov. 19-21, Investment Casting Institute: Fall meeting, Sheraton Hotel, Chicago. Institute's address: 27 E. Monroe St., Chicago 3, Ill. Executive secretary: H. P. Dolan.

Nov. 20, American Iron & Steel Institute: Regional technical meeting, Warwick Hotel, Philadelphia. Institute's address: 150 E. 42nd St., New York 17, N. Y. Secretary: George S. Rose.

Nov. 21, National Industrial Conference Board Inc.: General session for all associates, Hotel Schroeder, Milwaukee. Board's address: 460 Park Ave., New York 22, N. Y. Secretary: Herbert S. Briggs.

Dec. 1-6, American Society of Mechanical Engineers: Annual meeting, Hotel Statler, New York. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: C. E. Davies.

Dec. 2-6, Exposition of Chemical Industries: Coliseum, New York. Information: International Exposition Co., 480 Lexington Ave., New York 17, N. Y. President: E. K. Stevens.

Dec. 4-6, Building Research Institute: Conference on adhesives and sealants in building, Shoreham Hotel, Washington. Institute's address: 2101 Constitution Ave., Washington 25, D. C. Executive director: William H. Scheick.

Dec. 4-6, American Institute of Mining, Metallurgical & Petroleum Engineers: Electric furnace steel conference, William Penn Hotel, Pittsburgh. Institute's address: 29 W. 39th St., New York 18, N. Y. Secretary: E. O. Kirkendall.

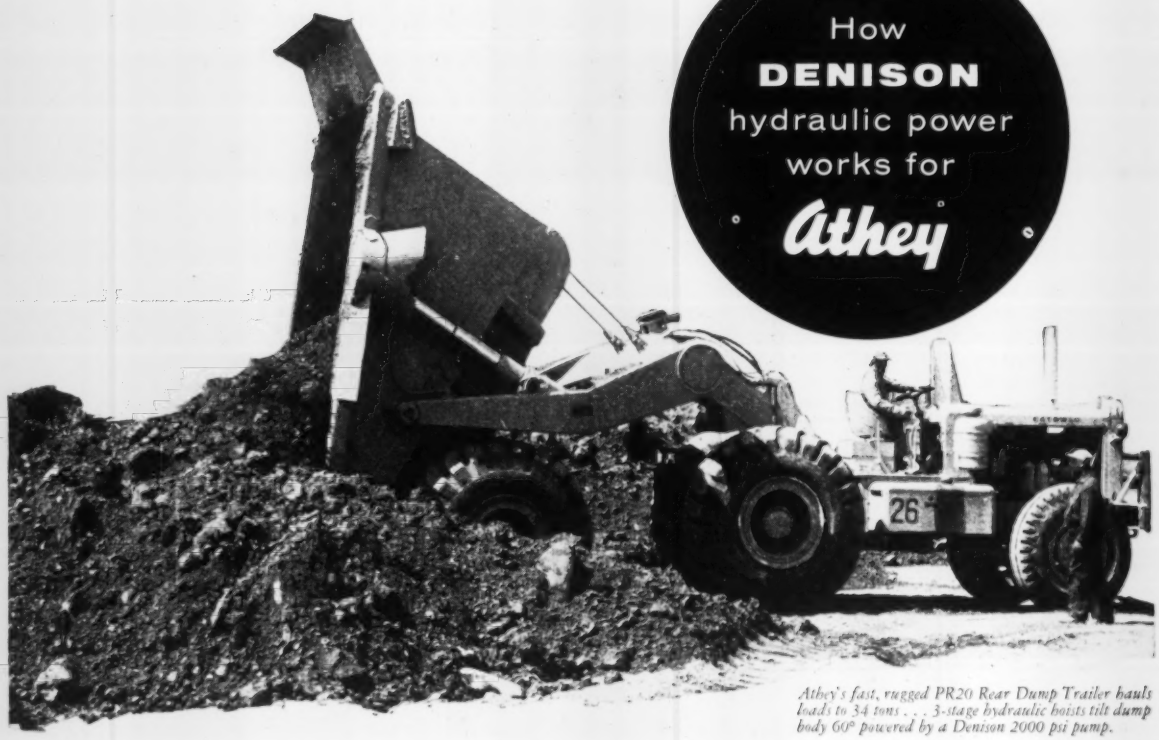
Dec. 5-7, National Association of Manufacturers: Congress of American Industry, Waldorf-Astoria Hotel, New York. Association's address: 14 W. 49th St., New York 20, N. Y. Managing director: Kenneth R. Miller.

Dec. 10-11, Society of the Plastics Industry Inc.: Conference on vinyl products in the consumer field, Hotel Commodore, New York. Society's address: 250 Park Ave., New York 17, N. Y. Executive vice president: William T. Cruse.

Dec. 11-12, National Construction Industries Conference: Hotel Sherman, Chicago. Sponsor: Armour Research Foundation, 10 W. 35th St., Chicago 16, Ill.

UDYLITE MACHINE
processes washer-dryers
at WHIRLPOOL for perfect
porcelain
This Udylite Full Automatic operating in a plant of the Whirlpool Corporation helps give perfect porcelain finishes to the Whirlpool Washer-Dryers. It processes the parts through a 17 station cleaning and pickling cycle prior to porcelain coating. Since June 1, 1956, this Udylite machine has operated constantly 16 to 24 hours per day.
Nowhere is the fine porcelain finish more dependent on precision than in this cleaning, pickling, and nickel immersion cycle of the Udylite engineered machine. Every step of the cycle is so precisely timed that each part gets the same exact treatment prescribed by Whirlpool engineers.
Add Udylite experience to your knowledge for the right answer to your metal processing problems. Write us today.
THE Udylite CORPORATION
DETROIT 11, MICHIGAN
WORLD'S LARGEST
PLATING SUPPLIER

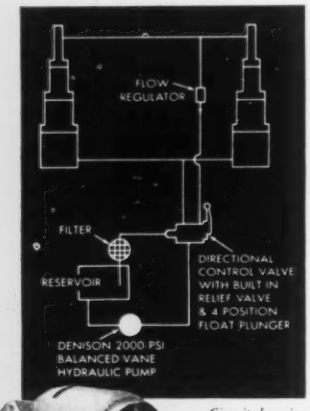
How **DENISON** hydraulic power works for *Athey*



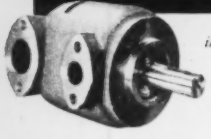
Athey's fast, rugged PR20 Rear Dump Trailer hauls loads to 34 tons . . . 3-stage hydraulic hoists tilt dump body 60° powered by a Denison 2000 psi pump.

34-TON PAYLOAD DUMPED ON THE DOUBLE

. . . another application for DENISON hydraulic power


FLOW REGULATOR
FILTER
RESERVOIR
DIRECTIONAL CONTROL VALVE WITH BUILT IN RELIEF VALVE & 4 POSITION FLOAT PLUNGER
DENISON 2000 PSI BALANCED VANE HYDRAULIC PUMP

Circuit drawing illustrates 2000 psi hydraulic system for powering 3-stage hydraulic hoists on Athey's PR20 Rear Dump Trailers.



Denison 2000 psi vane-type hydraulic pump.

TODAY'S high-speed earthhauling operations call for *fast dumping* to save valuable minutes . . . where minutes are big money. That's why Athey Products Corporation depends on Denison hydraulic power to dump its PR20 Rear Dump Trailers quickly, completely.

Each 34-ton capacity trailer is equipped with one-lever hydraulic controls . . . and 3-stage, double-acting hydraulic hoists that tilt the dump body 60°.

A single Denison 2000 psi balanced-vane hydraulic pump, driven by the tractor engine's power take-off, extends the hoists . . . dependably, efficiently. That's because there's generous reserve stamina in the Denison pump to meet toughest work conditions.

With the Denison "T" Series pump, Athey designers assure all-weather pump-starting ability. Field servicing is speedy because the complete pumping cartridge is removable as a unit. *Result: lower operating cost . . . dependable continuous performance.*

There's less weight, less cost-per-horsepower—with smaller lines and valves with the Denison 2000 psi pump as the heart of a hydraulic system. Design flexibility is unlimited.

Have your Denison hydraulic specialist tell you more about how the 2000 psi pump can improve performance of your equipment. Write Denison Engineering Division, American Brake Shoe Co., 1180 Dublin Road, Columbus 16, Ohio.

DESIGNERS—ENGINEERS! New Bulletin 201 describes "How To Design More Efficient Hydraulic Power Into Mobile Machinery". Write for it.

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HYDRAULIC PRESSES • PUMPS • MOTORS • CONTROLS

DENISON HydrOILics

Memo to a Man of "Parts"

The number of different parts made from Roebling High Carbon Specialties, Flat Wire and Spring Steel are close to countless.

Some things you can count on, though, are the consistent dimensional and mechanical uniformity you get with any Roebling High Carbon Specialty. They are the qualities that contribute to speeding *your* production and cutting *your* costs.

They are high qualities that make for high values. Next time you need flat wire or spring steel, specify Roebling. Write Wire and Cold Rolled Steel Products Division, John A. Roebling's Sons Corporation, Trenton 2, New Jersey.

ROEBLING

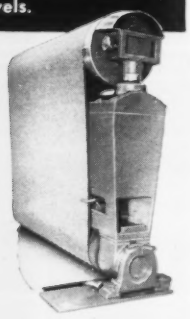
Branch Offices in Principal Cities
Subsidiary of The Colorado Fuel and Iron Corporation

Roebling... Your Product is Better for it

HILL GRINDING AND POLISHING MACHINES
For FINISHING
Any and All
FERROUS and NON-FERROUS MATERIALS . . .

HILL Polishing Machine
(Hydraulic Table Type)
For polishing individual sheets and plates. Hydraulic reciprocating table with centralized controls.

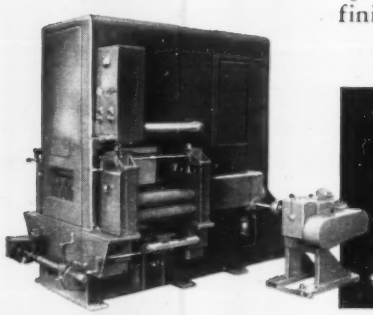
The basic HILL two-roll vertical head with upper steel idler roll and lower rubber covered contact or work roll (both dynamically balanced) over which the endless abrasive belt travels.



FLAT surfaces of ferrous or non-ferrous material can be brought quickly to the high finish so necessary for today's industrial and consumer products. The dairy, automotive, home appliance and engraving industries are typical of the wide range of application for these precise, labor saving machines.

HILL abrasive belt grinding and polishing machines are built in two general types. The hydraulic reciprocating table type polished individual sheets and plates. Table widths vary from 36″ to 60″. Table lengths range from 60″ to 240″. The Pinch-Roll type is for progressive line polishing. The HILL two-roll vertical head with endless abrasive belt is the basic principle common to both types.

When writing for information please indicate size and specifications of stock to be finished.



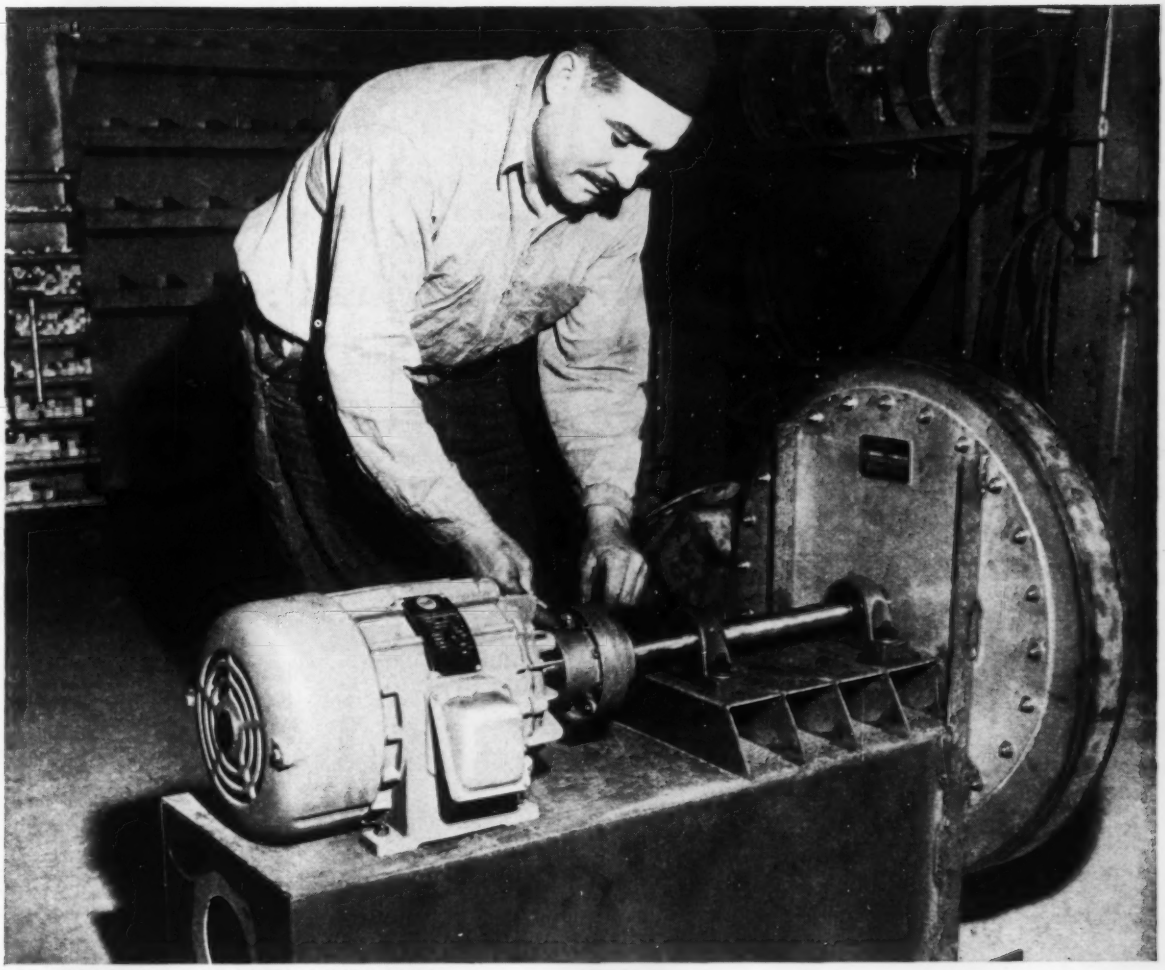
HILL Grinding and Polishing Machine
(Pinch-roll Type)
For pre-finishing, conditioning and polishing. Used as single units or in multiple units for progressive line polishing in wet or dry operations.

HILL ACME TOOLS FOR INDUSTRY

THE HILL ACME COMPANY

HILL DIVISION
ESTABLISHED 1882
1201 West 65th Street • Cleveland 2, Ohio

"HILL" GRINDING & POLISHING MACHINES • HYDRAULIC SURFACE GRINDERS • ALSO MANUFACTURERS OF "ACME" FORGING • THREADING • TAPPING MACHINES • "CANTON" ALLIGATOR SHEARS • BILLET SHEARS • "CLEVELAND" KNIVES • SHEAR BLADES



AT CHICAGO BLOWER COMPANY

DIEHL motors increase product acceptance

To back up their reputation for first-quality design and workmanship in the manufacture of heating ventilating, air-conditioning and exhaust systems, Chicago Blower Company Chicago, Ill., relies on top-flight manufacturers for certain equipment components

"Insofar as the all-important power drive is concerned", says Chicago Blower's President, Fred H. Gohl," . . . we feel we are giving our customers the very best when we give them a DIEHL motor."

In more than ten years of DIEHL motor use, Mr. Gohl knows of no instance in which there has been a failure. And he is enthusiastic about the nationwide chain of DIEHL authorized service stations which are never farther away than the nearest telephone if maintenance or repairs should be needed. These two factors, he says, have definitely contributed to the increased acceptance of their products and explains why Chicago Blower is a consistent user of DIEHL motors.

This is another example of how a forward-looking manufacturer turned to DIEHL for help in building equipment of superior design and performance. With almost three-quarters of a century of experience in producing better motors for varied classes of industry, DIEHL will gladly help you meet *your* motor needs. We will work closely with you to provide the right motor—at the right time—at the right price.

Diehl

DIEHL MANUFACTURING COMPANY
Electrical Division of
THE SINGER MANUFACTURING COMPANY
Finderne Plant, SOMERVILLE, N. J.

☐ Please send me Consolidated Motor Catalog and Price List No. S-11—3540

☐ Please have a DIEHL representative call

NAME_____

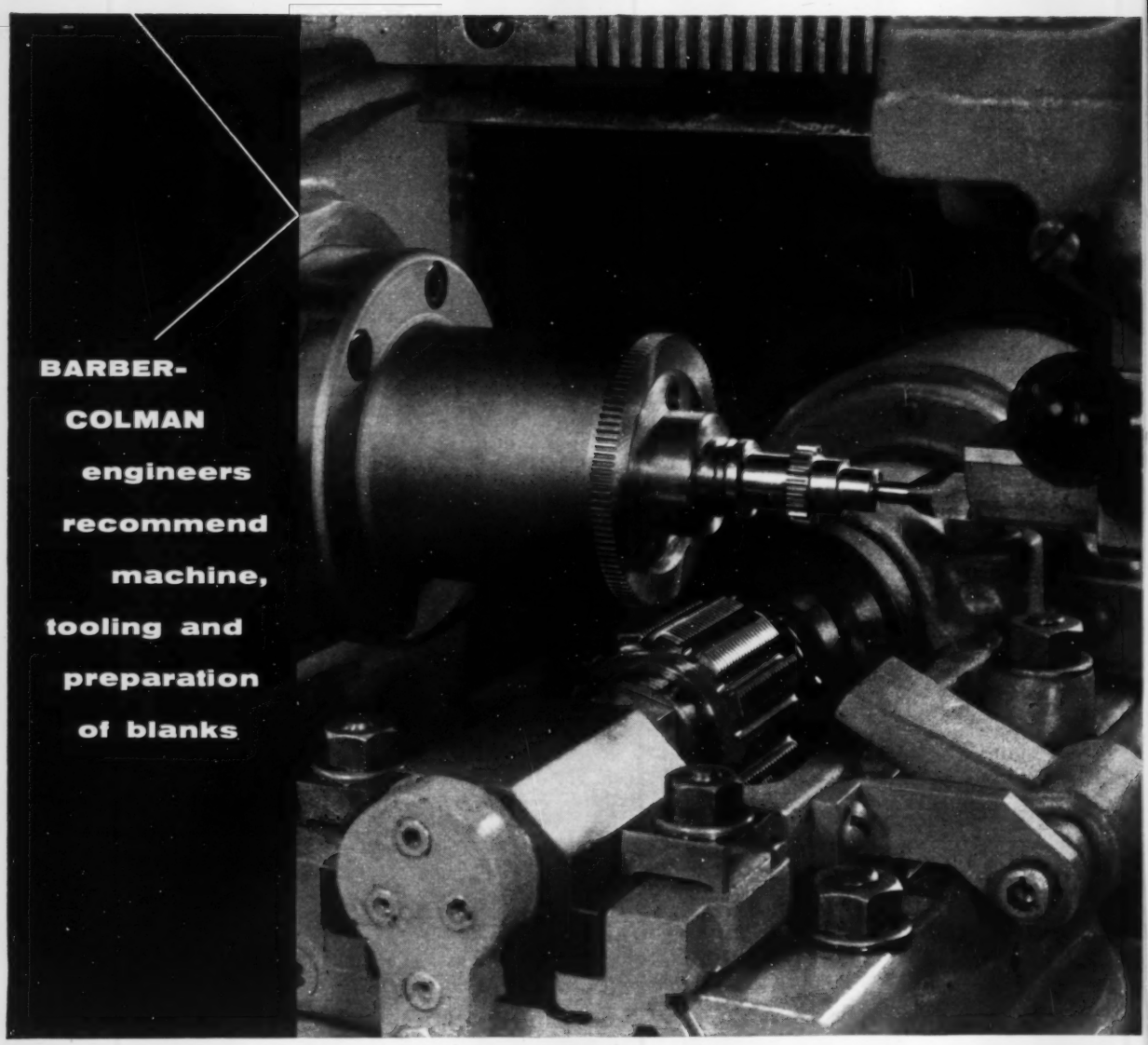
COMPANY_____

STREET_____

CITY_____ ZONE_____ STATE_____

Baltimore • Chamblee, Ga. • Charlotte • Chicago • Cincinnati • Los Angeles • Milwaukee • Needham, Mass. • New York • Philadelphia • Syracuse

GUARANTEED ACCURACY
with standard-type precision hobbing machines



The Kearney and Trecker Corporation have designed a servo-control mechanism for controlling an airframe section profile and contour milling machine. The extreme accuracy required for the transfer of motion in this mechanism demanded a whole new approach to the production of gears at Kearney and Trecker.

Barber-Colman Engineers were consulted for their suggestions to assure gear accuracy for this program. They recommended a standard-type No. 6-10 Precision Hobbing Machine and designed special tooling for each of the eight gears in the mechanism. They also specified the preparation of the blanks for hobbing.

This machine is guaranteed to cut a 4″ diameter spur gear within .0002″ adjacent and .0004″ non-adjacent spacing error checked on an optical dividing head. The blanks are ground on the diameter and sides, holding the diameter, parallelism and radial and axial runout within .0001″. Two holes are provided for driving the gear during hobbing.

These photographs show one of the gears in the train and the special tooling designed for it. The blanks are located between centers and are driven by a diamond-shaped pin in the backing plate. For hobbing this 48 D.P., 115 tooth gear, a feed of .010″ is used, and the hob speed is 183 R.P.M. The material is stress-proof steel R.C. 27. Barber-Colman Class AA taper-bore hobs are used and resharpened to original hob accuracy on a Barber-Colman No. 6-5 Hob Sharpening Machine.

With this equipment and recommended procedure, all gears in the train are hobbed well within Precision Class 2 AGMA tolerances. The success of this program is indicated by the results obtained on the example shown. Inspection shows these gears are consistently within .0002″ tooth-to-tooth and .0004″ total composite error.

Accuracy of this degree is not unusual with Barber-Colman machines and hobs. This case shows the results which can be obtained by working closely with, and following the recommendations of, experienced hobbing technicians. When you have applications requiring accurate gears, consult Barber-Colman hobbing experts for their recommendations.

BARBER-COLMAN COMPANY

6311 ROCK STREET • ROCKFORD, ILLINOIS

Hobs • Cutters • Reamers • Hobbing Machines • Hob Sharpening Machines

BARBER COLMAN

broken sardines and cut fingers

You avoid broken sardines and cut fingers when you open stubborn cans with their handy keys—keys which are often made from special uniformly tempered, low carbon CF&I-Wickwire Can Key Wire.

Chances are you don't need wire to make can keys. But *you may need one or more of the nearly 100 different categories of specialty wire for which CF&I-Wickwire is famous.* Let us show you how we can meet your most rigid chemical and physical specifications on high and low carbon wire in all sizes, shapes, tempers, finishes and grades.

Check This List!

FOR THE WIRE YOU REQUIRE, SEE CF&I-WICKWIRE.

FLAT AND SHAPED WIRES
Armor Wire
Bobby Pin Wire
Bookbinder Wire
Brush Wire
Casing Wire
Cotter Pin Wire
Curtain Spring Wire
Die Spring Wire
Gutter Broom Wire
Lock Spring Steel
Rake Tine Steel
Regulator Spring Wire
Snake Fishing Steel
Stapling Wire for Preformed Staples (Flat)

LOW CARBON FINE AND SPECIALTY WIRE
Bee Wire
Bonnet Wire
Bookbinder Wire
Broom Wire
Clip Wire
Dent Spacer Wire
Drapery Pin Wire
Florist Wire
Fuse Wire
Glass Netting Wire
Hairpin Wire
Hook and Eye Wire
Mattress Wire
Picture Cord Wire
Picker Tooth Wire
Pin Ticket Wire
Pin Wire
Ring Traveller Wire
Spiral Binding Wire
Stapling Wire
Stapling Wire for Preformed Staples
Stone Wire
Weaving Wire
Weaving Wire for Fly Screen Cloth
Wissco Iron Wire

HIGH CARBON FINE AND SPECIALTY WIRE
Aircraft Cord Wire
Armor Wire
Belt Hook Wire
Bobbin Ring Wire
Brush Wire (Tempered and Untempered)
Brush Wire (High Strain)
Chrome Vanadium Spring Wire
Core Wire (Aluminum Cable Steel Reinforced)
Curtain Spring Wire
Flexible Shaft Wire
"Gamma" Spring Wire (Upholstery Spring Wire)
Zig Zag Wire
No-Sag Wire
Hat Wire
Heddle Wire
Hose Reinforcement Wire
Hose Wire, Mechanical
Hose Wire, Vacuum and Defroster
Rope Wire
Signal Corps Wire
Spoke Wire
Hard Drawn Spring Wire
Oil Tempered Wire
Spheroidized or Annealed Spring Wire
Tire Bead Wire
Valve Spring Wire

MANUFACTURERS LOW CARBON COARSE WIRE
Bag Tie Wire
Basket Handle Wire
Box Binding Wire
Brush Handle Wire
"Cal-Tie" Wire
Can Key Wire
Case Hardened Ball Wire
Chain Wire
Clamp Wire
Clothes Pin Wire
Concrete Wall Reinforcement Wire
Garment Hanger Wire
Hay Baling Wire (Coiled)
Lingo Wire
Lintel Wire
Loop Wire
Merchant Quality Wire
Pail Bail Wire
Rivet Wire
Stapling Wire
Strand Wire
Tying Wire
Welding Wire
Wissco Iron Wire
Industrial Quality Wire
Cold Rolling Quality Wire
Heading, Forging or Roll Threading Quality Wire
Medium High Carbon Wire

CF&I-WICKWIRE WIRE

THE COLORADO FUEL AND IRON CORPORATION

THE COLORADO FUEL AND IRON CORPORATION—Albuquerque • Amarillo • Billings • Boise • Butte • Casper Denver • El Paso • Ft. Worth • Houston • Kansas City • Lincoln (Neb.) • Oklahoma City • Phoenix Pueblo • Salt Lake City • Wichita • PACIFIC COAST DIVISION—Los Angeles • Oakland • Portland San Francisco • Seattle • Spokane • WICKWIRE SPENCER STEEL DIVISION—Atlanta • Boston • Buffalo Chicago • Detroit • New Orleans • New York • Philadelphia • CF&I OFFICES IN CANADA: Toronto • Montreal
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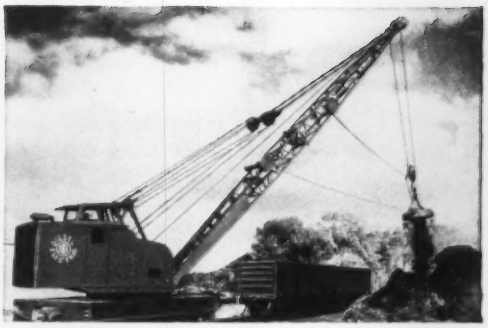
CF&I

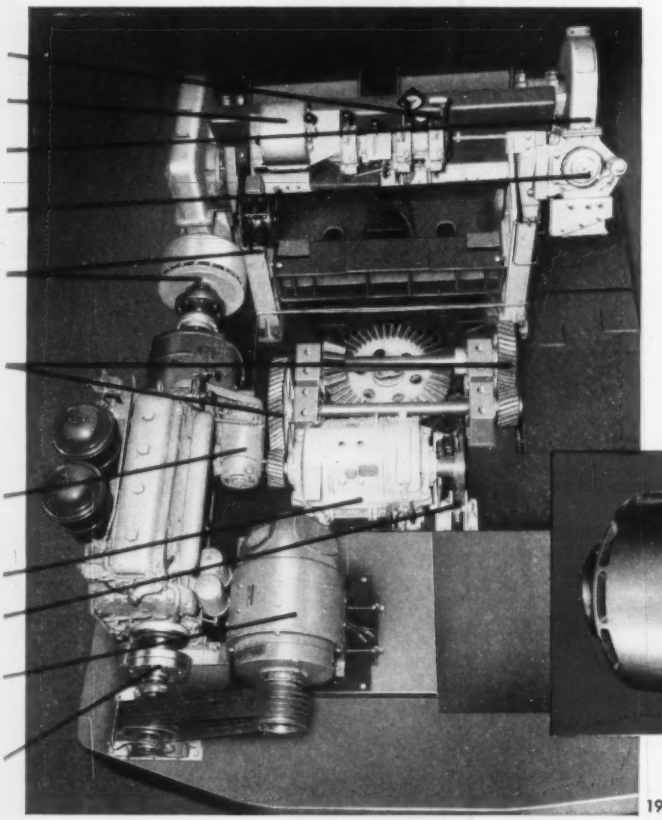
4241

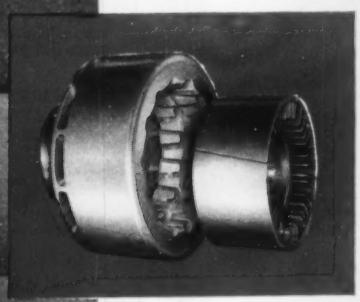
HOW THE ELECTRIC ROTATING MECHANISM IN I. B. LOCOMOTIVE CRANES increases operating speed and efficiency



Wherever crane rotation is unusually severe (magnet and bucket operations), an electric rotation unit (optional at extra cost) can be supplied with Industrial Brownhoist Cranes. The savings in maintenance and the greater efficiency plus the elimination of friction clutches offset the cost in a short time. The generator in the electric rotating motor is large enough to supply power for magnet service, and the complete rotation mechanism is easily accessible, being mounted on the top of the rotation bed. Reversing the flow of current through the motor, quickly and smoothly reverses the direction of rotation. • The carbody, trucks, monitor-type cab, and machinery arrangement of I. B. equipment have been equally well engineered. Write for Catalog No. 548 for complete information.

- PUSH BUTTON MAGNET CONTROL
- ROTATING CONTROLLER
- SAFE WORM DRIVEN BOOM HOIST
- AUTOMATIC BOOM HOIST BRAKE
- DYNAMIC CLUTCH AND CONTROLLER
- ELECTRIC ROTATION GEAR REDUCTION UNITS MOUNTED ON ANTI-FRICTION BEARINGS (HERE SHOWN WITH OIL CASES REMOVED)
- 1500-WATT BATTERY GENERATOR FOR STARTING AND NIGHT LIGHTING EQUIPMENT
- ROTATING MOTOR
- ROTATING BRAKE
- ROTATING AND MAGNET GENERATOR SUPPLIES CONSTANT VOLTAGE
- FLEXIBLE COUPLING





THE DYNAMATIC CLUTCH between the engine and crane machinery is a driven rotor within a magnetic field assembly . . . mounted on friction bearings. A 32-step control gives accurate power response, eliminates torsional impulse and vibration and allows positive control in handling loads.

194

BROWNHOIST

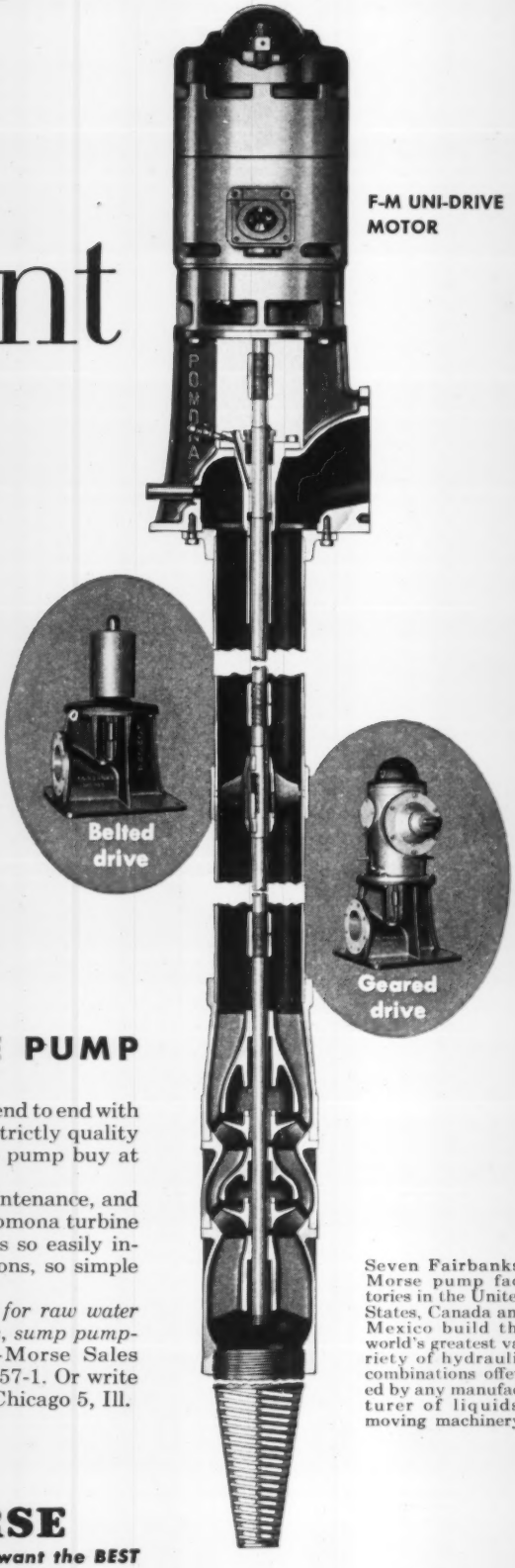
BROWNHOIST MATERIALS HANDLING EQUIPMENT GIVES A LIFT TO AMERICAN INDUSTRY

SUBSIDIARY OF Penn-Texas CORPORATION

INDUSTRIAL BROWNHOIST CORPORATION
BAY CITY, MICHIGAN • DISTRICT OFFICES: New York, Philadelphia, Cleveland, San Francisco, Chicago; Montreal, Canada
AGENCIES: Detroit, Birmingham, Houston, Los Angeles.

Quantity
PRODUCTION
of
GREY IRON CASTINGS
ONE OF THE NATION'S
LARGEST AND MOST MODERN
PRODUCTION FOUNDRIES
ESTABLISHED 1866
THE WHELAND COMPANY
FOUNDRY DIVISION
MAIN OFFICE AND MANUFACTURING PLANTS
CHATTANOOGA 2, TENNESSEE

You'll want to look into this pump



F-M UNI-DRIVE MOTOR

NEW F-M POMONA WATER-LUBRICATED TURBINE PUMP

Here is an all-new, extra rugged pump designed from end to end with the cost-conscious user in mind. A close look at its strictly quality features reveals why it's recognized as today's top pump buy at *any* price.

For ruggedness of construction, simplicity of maintenance, and strictly quality design throughout, this new F-M Pomona turbine pump is today's greatest value. No other pump is so easily installed, so easy to adjust for varying field conditions, so simple to change between electric, belted or geared drive.

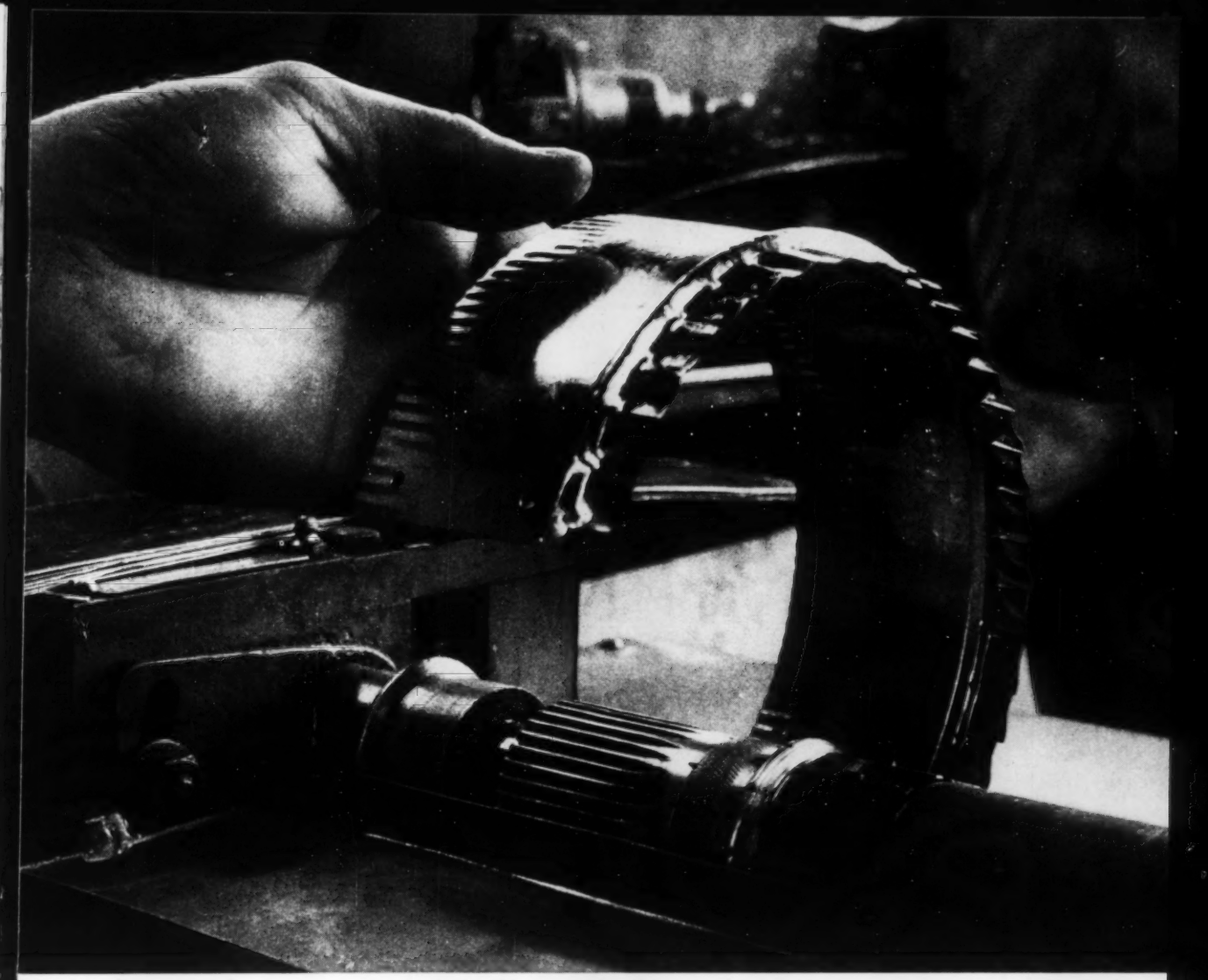
Ask for details on this new F-M Pomona pump for raw water supply, air conditioning, refrigeration, cooling towers, sump pumping, dewatering, etc. Contact your Fairbanks-Morse Sales Engineer today. Ask for new illustrated Bulletin 6957-1. Or write Fairbanks, Morse & Co., 600 So. Michigan Ave., Chicago 5, Ill.

Seven Fairbanks-Morse pump factories in the United States, Canada and Mexico build the world's greatest variety of hydraulic combinations offered by any manufacturer of liquids-moving machinery.

FAIRBANKS-MORSE

a name worth remembering when you want the BEST

PUMPS • SCALES • DIESEL LOCOMOTIVES AND ENGINES • ELECTRICAL MACHINERY • RAIL CARS • HOME WATER SERVICE EQUIPMENT • MAGNETOS



"WE USE WEIRKOTE® ONLY— ITS ZINC COATING IS FOR KEEPS!"

You come across that thought a lot when you talk with users of Weirkote zinc-coated steel.

Ask *why* they're so sold and you hear that Weirkote gives a better job at *lower* cost. Weirkote fabricates easily. Takes the toughest crimping, bending, twisting, lock seaming, the deepest draws. Its tight zinc coating stays on for keeps.

With Weirkote zinc-coated steel there's no need for costly protective plating, painting or redipping after fabrication. Makes a good-looking job anyone can be proud of. And it stays that way.

Weirkote is continuous-process zinc-coated steel at its best—highly resistant to corrosion, heat and noise. Cost from sheet to finished product is low.

Send for Weirkote Booklet

Look into Weirkote for added efficiency, economy in your operation. For free booklet, write today to Weirton Steel Company, Dept. A-3, Weirton, West Virginia.

WEIRTON STEEL COMPANY

WEIRTON STEEL COMPANY

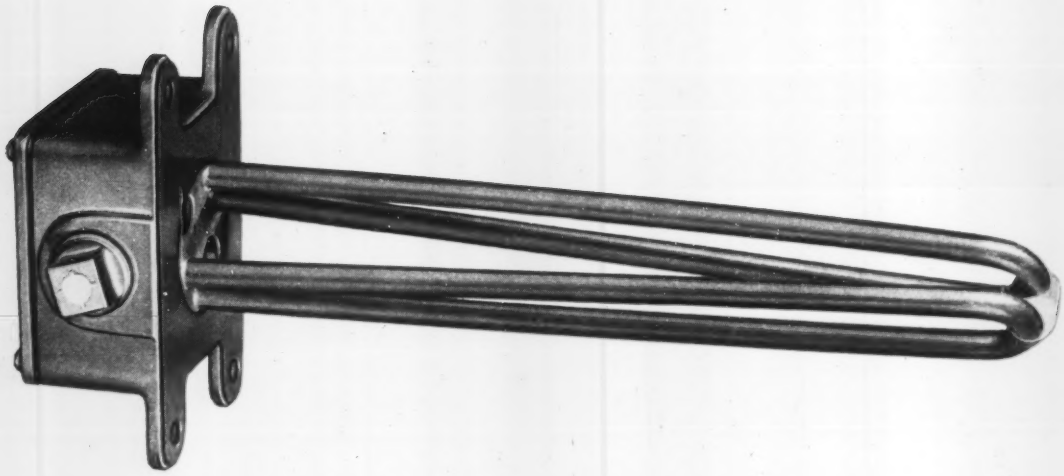
WEIRTON, WEST VIRGINIA

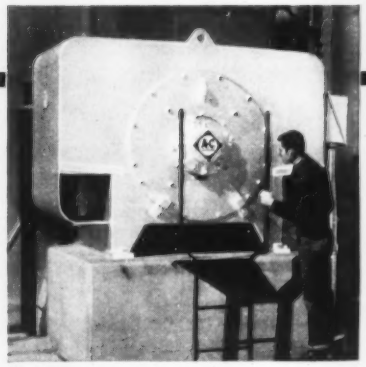
a division of

NATIONAL STEEL CORPORATION

One of many reasons why **ALLIS-CHALMERS MOTORS** are preferred for outdoor applications in the

METAL WORKING INDUSTRY





Weather-protected motor in outdoor service.

Space Heater is weather protected

(and corrosion-proof!)

Weather-protected heaters are standard on Allis-Chalmers outdoor motors . . . prevent moisture condensation on motor parts during shutdown periods. These immersion-type heaters are not only waterproof, they are also stainless steel clad for resistance to corrosion.

Easy Maintenance, too!

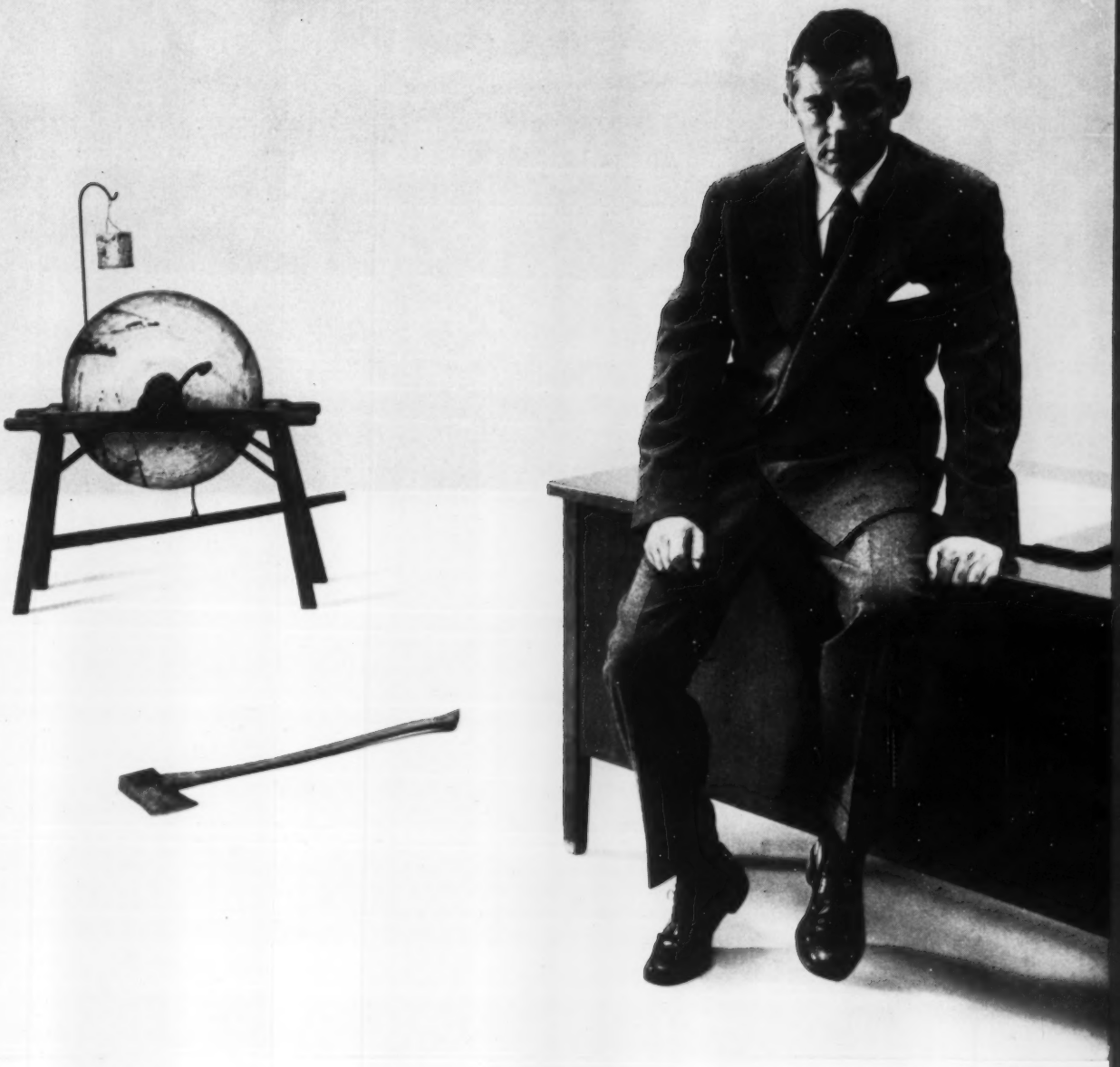
Heater terminal box mounts outside motor frame; heating element projects into motor enclosure. Open wiring inside motor is eliminated. Entire heating unit is easily removed for service or replacement.

For details on this and all the other outstanding features of Allis-Chalmers motors, call your nearby A-C office or write Allis-Chalmers, Power Equipment Division, Milwauke 1, Wisconsin.

A-C ALLIS CHALMERS

ALLIS-CHALMERS

A-5490



"We grind no axe... and really have no need to." After all, Bliss makes so many types and sizes of metalworking presses—actually many more than any other builder—that we favor only the one right press for your job. It may be a big one, a little one, a mechanical, a hydraulic, a standard or a special. But you can be sure it will be the *right* one.

If you have a pressed metal problem, isn't it logical to talk to a source that's certain to give you an impartial answer? To talk to Bliss?

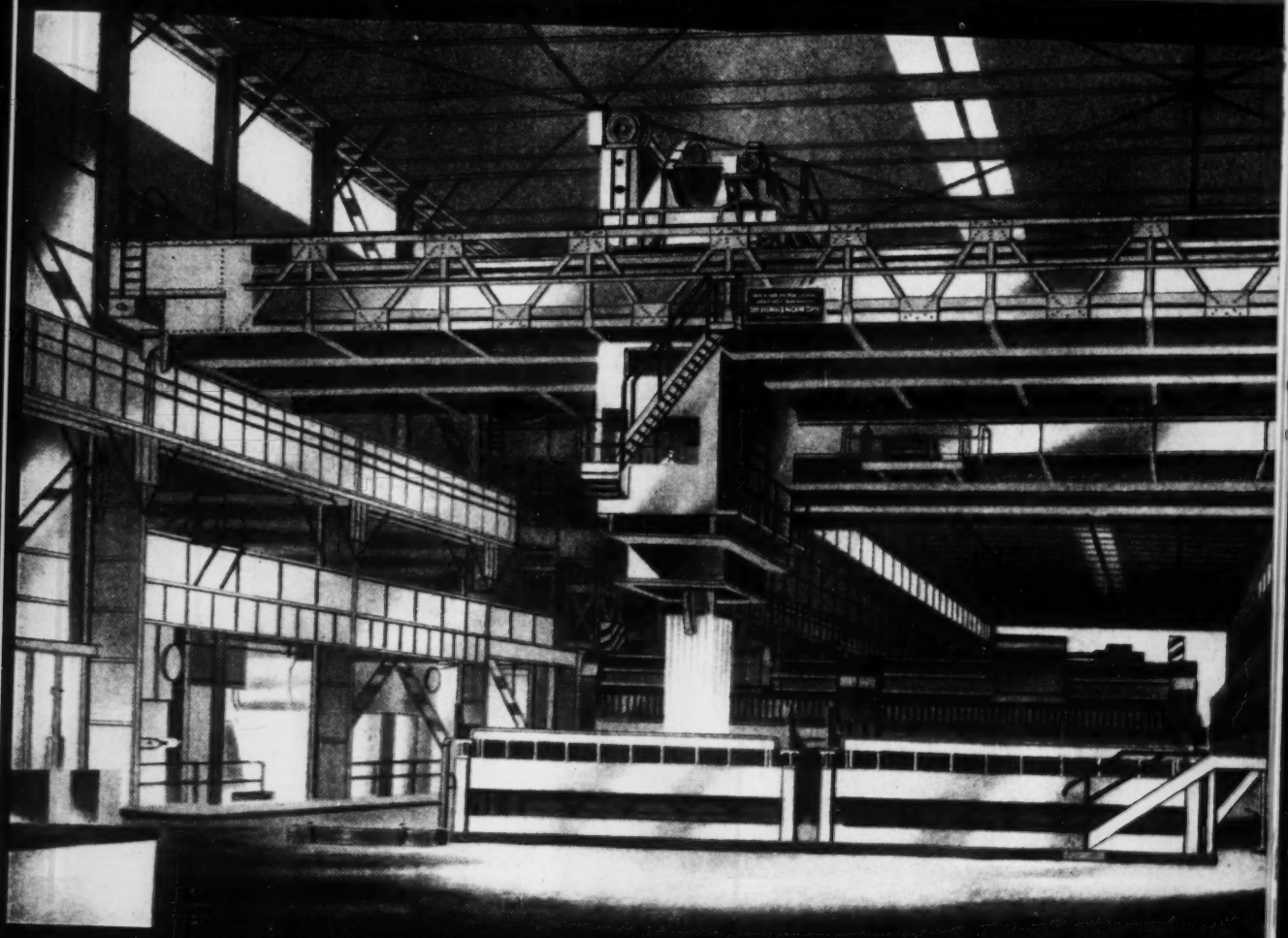
BLISS
SINCE 1857

E. W. BLISS COMPANY · Canton, Ohio

100 years of making metal work for mankind

PRESSES • ROLLING MILLS • MILL ROLLS • DIE SETS • CAN MACHINERY • ORDNANCE

INTENSIFIED GRIP...



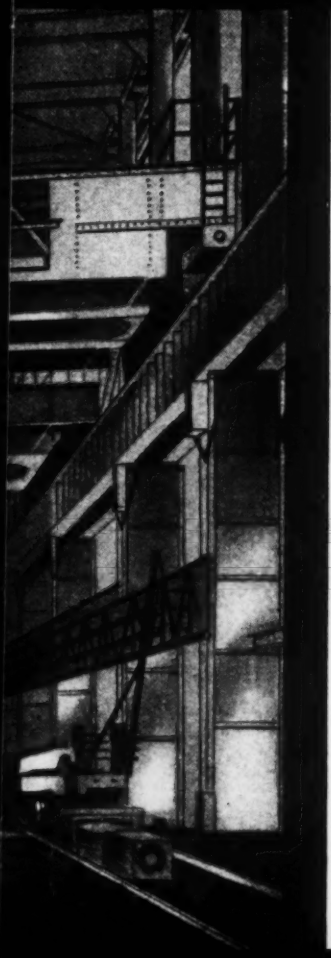
The tong grip of the conventional soaking pit crane depends *solely* on the weight of the ingot and when the weight of the ingot is removed, as in the case of placing an ingot on an approach mill table, the grip is reduced to zero and the ingot drops.

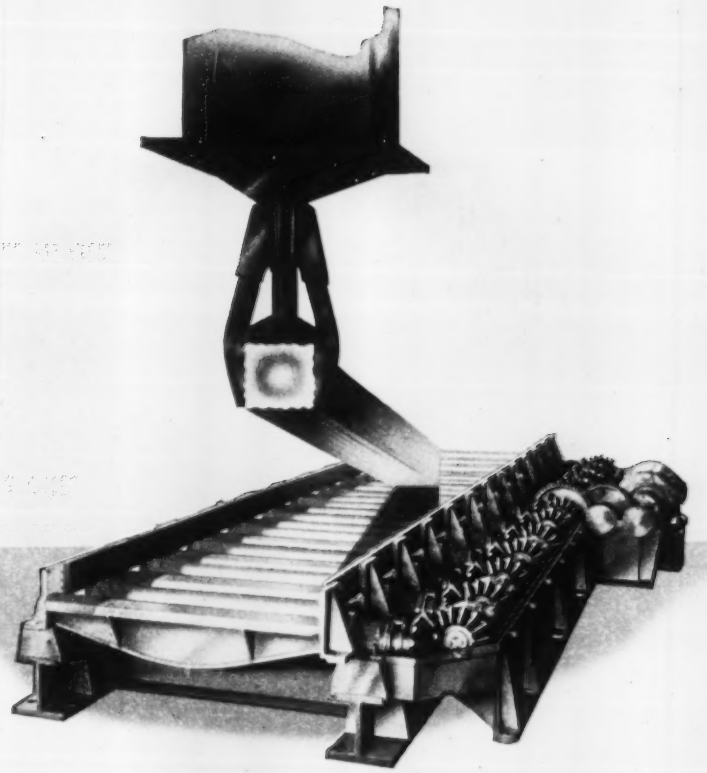
The tongs' grip of the Alliance intensified grip soaking pit crane is produced by the weight of the column *plus* the weight of the ingot. Since the weight of the column is usually equal to the weight of the ingot, the intensified grip soaking pit crane has the same grip *without* an ingot in the tongs as a conventional soaking pit crane has with an ingot, and *twice as much grip* as the conventional soaking pit crane when handling an ingot.

These intensified grip soaking pit cranes are built to handle ingots of any size and weight and incorporate all modern safety features. We welcome the opportunity to assist in solving your material-handling problems.

THE ALLIANCE MACHINE COMPANY

for Soaking Pit Cranes





The intensified grip soaking pit crane was developed by The Alliance Machine Company to hold ingots more firmly in the tongs and prevent dropping of ingots when they are placed on the mill approach table, ingot chariot or in the soaking pits. This is an exclusive Alliance feature.

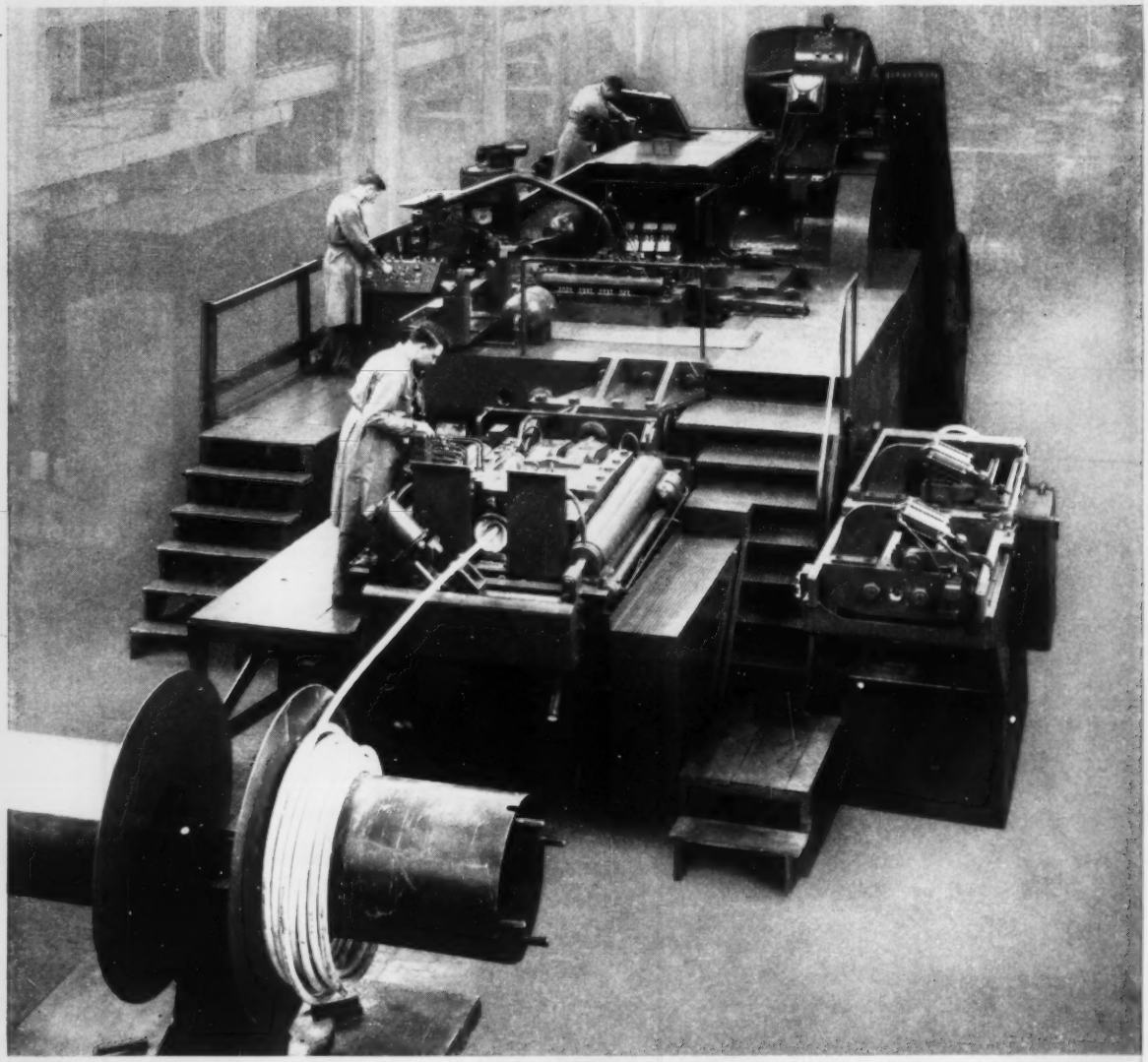
Alliance

LADLE CRANES • GANTRY CRANES • FORGING MANIPULATORS • SOAKING PIT CRANES • STRIPPER CRANES • SLAB AND BILLET CHARGING MACHINES • OPEN HEARTH CHARGING MACHINES • SPECIAL MILL MACHINERY • STRUCTURAL FABRICATION

• MAIN OFFICE • ALLIANCE, OHIO

THE WORLD'S LARGEST BUILDER OF THE WORLD'S LARGEST CRANES

Cleveland Cap Feeds This Biggest 13 Minutes and Produces 494



THE 1-1/4-INCH BOLTMAKER

WEIGHT: 400,000 POUNDS
MOTOR HORSEPOWER: 200
PIECES PER MINUTE: 38

Boltmaker One Ton of Steel Every Four-Pound Cap Screws . . .

20 Times Faster!

This 1-1/4" x 10" Cleveland precision cap screw is now being cold-forged automatically on the Boltmaker at the rate of 38 per minute.

This tremendous 1-1/4" Boltmaker opens new horizons in the automatic cold-forging of metal components. It is the largest machine of its kind ever built, four times larger than its immediate predecessor, the 3/4" Boltmaker.

We pioneered this first 1-1/4" Boltmaker for The Cleveland Cap Screw Company. Specialists since 1916 in cap screws, set screws, studs and fasteners, including "larger than usually listed sizes," Cleveland Cap is now relying on its new 1-1/4" Boltmaker for the exacting task of producing the large cap screws illustrated above.

In this forging operation, the Boltmaker draws the steel rod to size, cuts it to proper length, extrudes the blank, heads, trims the head, points the end and rolls the threads, *all automatically!* All operations occur at one time and a complete, ready-to-use cap screw is cold-forged on each stroke of the machine. Grain flow in the head and threads is symmetrical and unbroken. The part is stronger because the forging action increases fatigue resistance and tensile strength.

This giant Boltmaker can be tooled to cold-forge many other large-size special products.

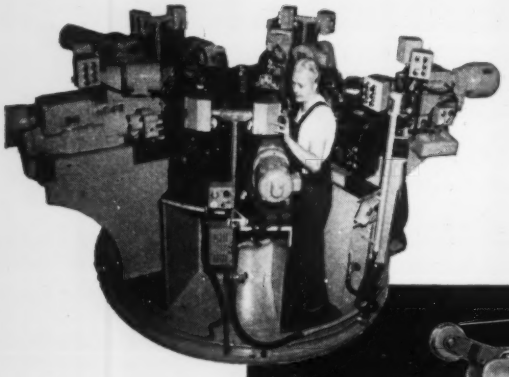
Whether your forging problem is one of making four-pound precision cap screws or a wide variety of other metal components in various sizes, we invite you to send us your prints and samples. Better yet, pay us a visit, and discuss with us how the latest methods, machines and ideas fit into your future metalworking production.

NATIONAL
MACHINERY COMPANY
TIFFIN, OHIO—SINCE 1874

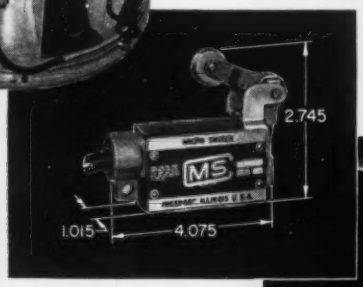
DESIGNERS AND BUILDERS OF MODERN FORGING MACHINES • MAXIPRESSES • REDUCEROLLS • COLD HEADERS • BOLTMAKERS • NUT FORMERS • TAPPERS • NAILMAKERS

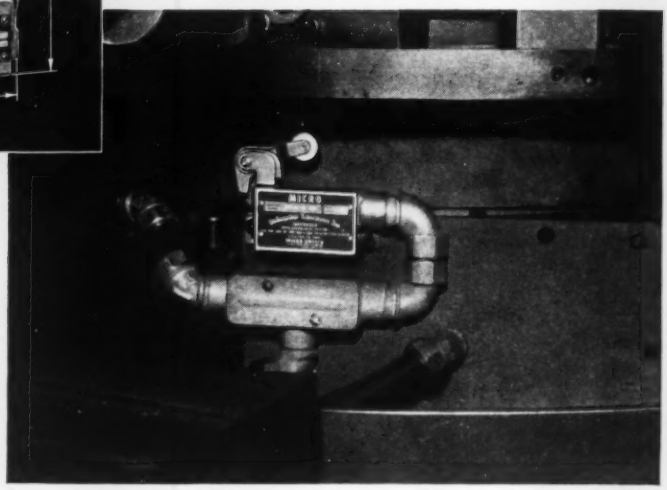
Hartford Detroit Chicago

MICRO SWITCH . . . FIRST IN PRECISION SWITCHING



Drilling Holes in $7500.00 parts leaves no margin for error





How 22 MICRO SWITCH precision switches assure accurate positioning of expensive titanium jet engine parts and control the operation cycle of this drilling and tapping machine

This eleven-station machine performs all the drilling and tapping operations on inlet guides for jet engine afterburners. If just one hole is slightly out of line, the inlet guide—valued at $7500—must be scrapped.

MICRO SWITCH precision switches were selected by the manufacturer, Hoefer Manufacturing Company, to assure accurate positioning. One switch serves as a master control for the entire machine, and eleven other switches control each of the eleven stations as limits, safeties and interlocks.

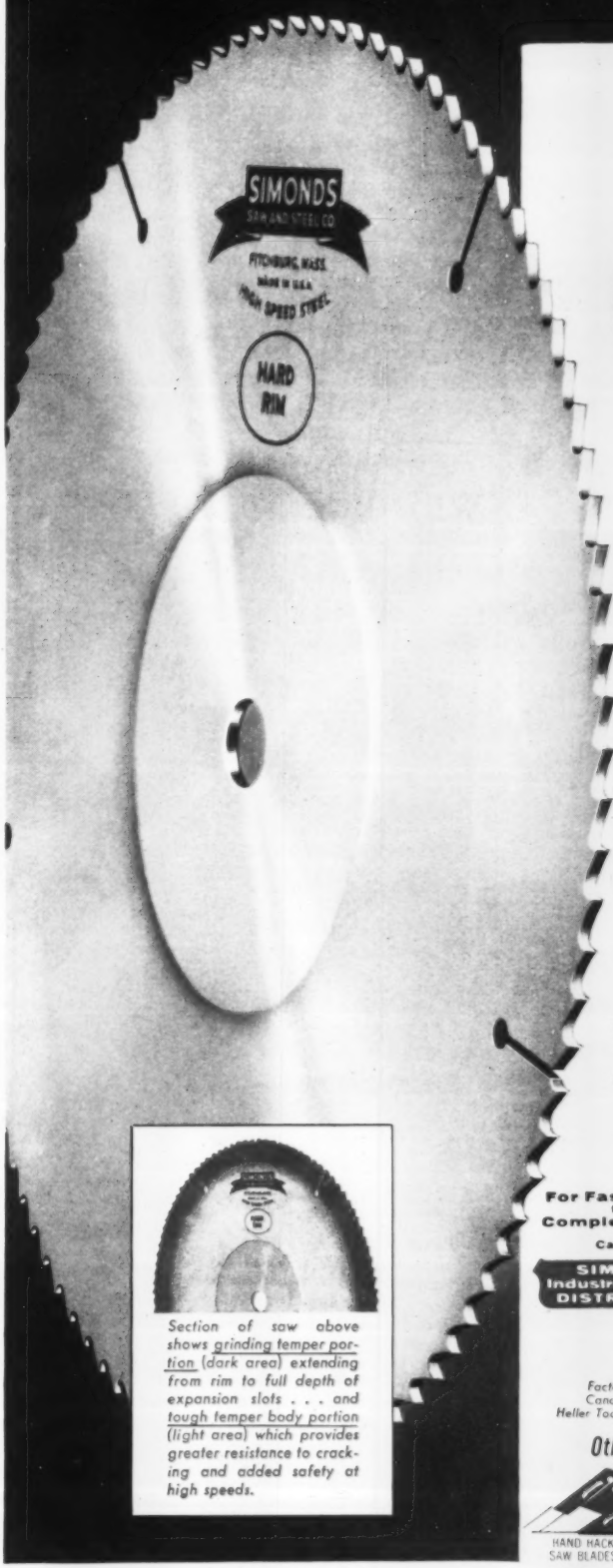
All twelve of these control switches are completely sealed to protect against the entrance of oil coolants. Ten additional MICRO SWITCH precision switches are used to control individual operations at the various stations. These ten phenolic enclosed switches are located within housings, two switches for each of the five motors.

There is a full selection of MICRO SWITCH precision switches for any switch application. Whatever your design, MICRO SWITCH components may help you make a good design even better.

Field engineering help is as near as your telephone. Call your nearby MICRO SWITCH branch office or distributor for complete information.

MICRO SWITCH
A DIVISION OF MINNEAPOLIS-HONEYWELL REGULATOR COMPANY
In Canada, Leaside, Toronto 17, Ontario • FREEPORT, ILLINOIS

NEW!



Section of saw above shows grinding temper portion (dark area) extending from rim to full depth of expansion slots . . . and tough temper body portion (light area) which provides greater resistance to cracking and added safety at high speeds.

SIMONDS HARD RIM SAW

• Longer Cutting Life
• Maximum Safety
• Minimum Kerf

Here's Simonds *newest* — a solid saw that offers longer cutting life and greater safety similar to Simonds Inserted Tooth or Segmental Saws. Specifically, it provides increased cutting life between sharpenings . . . decreased breakage at high speeds . . . and less kerf (as compared to non-solid saws). The saw *rim* is made extremely hard for tremendous resistance to abrasion and wear — the saw *body* is made just hard enough for true cutting of non-ferrous metals and plastics on all types of machines.

Simonds "Hard Rims" will produce a better finish because the solid tooth design cuts truer . . . you can safely run 'em at higher speeds because they will not shatter. And they can repeatedly be resharpened on standard saw grinding equipment. When you get yourself a Simonds "Hard Rim" (8″ to 18″ dia.), you've got yourself a SAW, brother!

For Fast Service from Complete Stocks
Call your
SIMONDS Industrial Supply DISTRIBUTOR

125 YEARS OF GROWTH • 1832-1957

SIMONDS SAW AND STEEL CO.
FITCHBURG, MASS.

Factory Branches in Boston, Chicago, Shreveport, La., San Francisco and Portland, Oregon
Canadian Factory in Montreal, Que., Simonds Divisions: Simonds Steel Mill, Lockport, N. Y. Heller Tool Co., Newcomerstown, Ohio, Simonds Abrasive Co., Phila., Pa., and Arvida, Que., Canada

Other High Quality SIMONDS Metalworking Products

HAND HACK SAW BLADES | POWER HACK SAW BLADES | FILES | BAND SAWS | ROTARY SHEAR KNIVES & SQUARING SHEARS | FLAT GROUND DIE STEEL

Products Unlimited . . .

that's what you have with the use of steel—not steel products alone necessarily, but steel to make literally thousands of products better. American Steel & Wire has been a wire maker to the nation for over 125 years. This experience has resulted in a know-how that is relied upon by manufacturers who use American Steel & Wire's quality steel to produce better products every day in every way.

Shave after shave after shave

Get a clean shave and your day is off to a good start. But, to get a clean shave, your blade must be sharp. American Steel & Wire makes razor-blade steel that takes a sharp edge—an edge that stays sharp, shave after shave after shave.

USS AMERSTRIP
COLD ROLLED STRIP STEEL

With the greatest of ease

Even without a trapeze, you can float through the air with the "greatest of ease"—if you use this unique diving trampoline which derives its bounce from quality-engineered USS American Springs. This is just one of many manufacturing applications of springs which are designed, produced and tested by American Steel & Wire.

USS AMERICAN
QUALITY SPRINGS

The Indispensable Pin

Styles in diapers change. What used to be a plain white triangle is often a flowered square today. However, you'll find the old reliable safety pin still the key item in this little lady's apparel . . . its use doesn't change. Each year, American Steel & Wire makes thousands of miles of high-quality wire for use in safety pins, bobby pins, hairpins.

USS AMERICAN
MANUFACTURERS WIRE

DEEP SLEEP

Everybody's talking about getting a good night's sleep. American Steel & Wire is helping to do something about it by supplying the best spring wire available to leading bedding manufacturers. Inner springs made from Premier Spring Wire "give" just enough to cradle a person comfortably and lure him into a deep sleep.

USS PREMIER
SPRING WIRE

Protection!

Fortunately, this lad protected himself where he is vulnerable. Production Departments could take a tip from him and forearm themselves against machining problems by using American Steel & Wire's Amer-Led. With this leaded steel, there are fewer rejects, closer work tolerances, longer tool life. As an example, Franz Manufacturing Co. increased their machining speed 17.4% with the use of Amer-Led for the axle-and-bearing cones of the roller skates shown here.

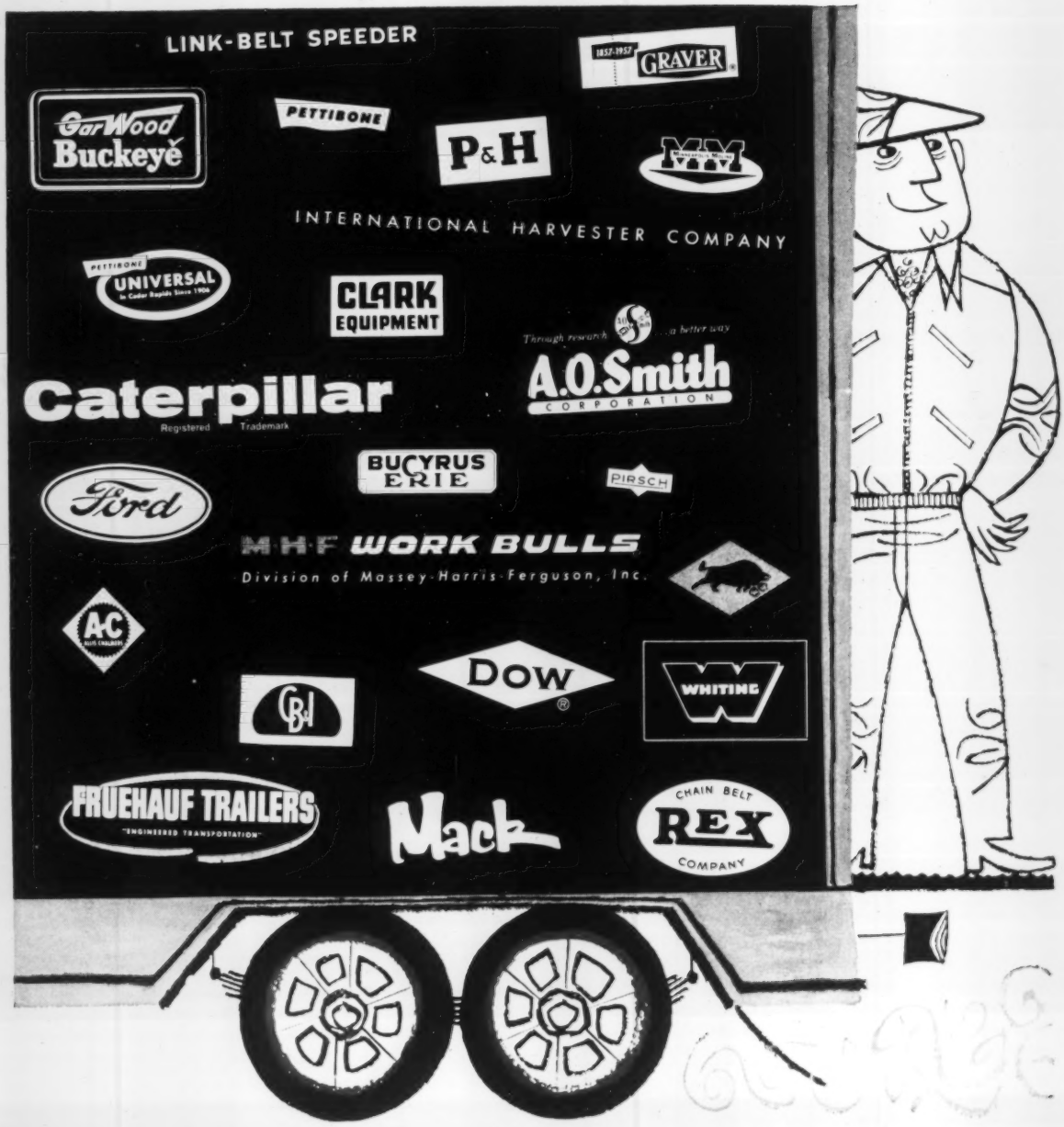
USS AMER-LED
COLD FINISHED BARS

USS

AMERICAN STEEL & WIRE
DIVISION
UNITED STATES STEEL

Over 125 years experience in wire making

We invite you to send for a free booklet which lists conveniently some of the 80,000 different items our plants produce. American Steel & Wire, Dept. 842, Rockefeller Bldg., Cleveland, Ohio.



Wherever feet or wheels must go . . . America's leading companies look to Inland 4-WAY® Safety Plate

Inland 4-WAY® Safety Plate

Carried in stock by all leading steel distributors

INLAND STEEL COMPANY

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Sales Offices: Chicago • Milwaukee • St. Paul • Davenport
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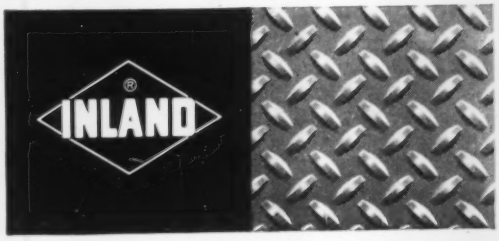
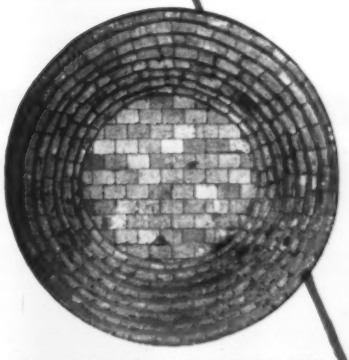


A. P. GREEN KX-99

KX-99 firebrick linings in hot metal cars and hot metal mixers provide extra tonnage that means extra savings

The superior toughness and uniformity of KX-99 in hot metal car and hot metal mixer linings has provided such outstanding service records, many leading steel companies have standardized on their use.

The exceptional properties of KX-99 brick enable them to better withstand erosion and slag action. Uniformity of size permits laying up KX-99 with very thin joints to better withstand the scouring and washing action of molten metal.



KX-99 LINING IN HOT METAL CAR.

A. P. Green
REFRACTORY PRODUCTS
SERVE THE WORLD'S INDUSTRIES

For detailed information on service and specific recommendations—contact your local A. P. Green Representative or write

A. P. GREEN FIRE BRICK COMPANY
Mexico, Missouri, U. S. A.

PLANTS: Mexico, Mo. • Woodbridge, N. J. • Sulphur Springs, Texas • Jackson, Oak Hill, South Webster, Ohio • Philadelphia, Pa. • Troy, Idaho

In Canada:
A. P. GREEN FIRE BRICK COMPANY, LTD.
Toronto 15, Ontario

Up to 40% higher tightening torques keep a

—and only the combination of an UNBRAKO screw

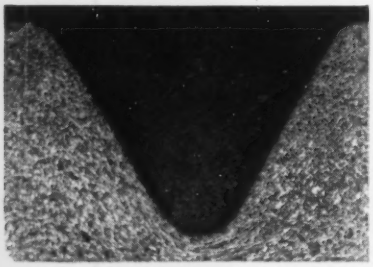
RECOMMENDED SOCKET SET SCREW TIGHTENING TORQUES
(Inch-Pounds)

SCREW SIZE	UNBRAKO	SET SCREW B	SET SCREW C	MINIMUM DIFFERENTIAL %
#4	5	3.9	3.5	28
#5	9	7.8	7.4	15
#6	9	7.8	7.4	15
#8	20	14.7	14.5	36
#10	33	26.5	25	25
1/4	87	62	60	40
5/16	165	122	125	32
3/8	290	198	225	29
7/16	430	309	350	23
1/2	620	460	500	24
5/8	1225	1106	1060	11
3/4	2125	1540	1800	18
7/8	5000	3660	4600	9
1	7000	5025	6500	8

The High-Torque UNBRAKO socket set screw is made to withstand the highest tightening torques ever used to seat a set screw—up to 40% higher than an ordinary set screw. But to take full advantage of this UNBRAKO feature you must have a key that can apply the force required to seat it without damaging the screw or snapping the key. The High-Titan UNBRAKO hex key is designed specifically to set a High-Torque UNBRAKO so that you can be assured of full *high-torque* performance every time.

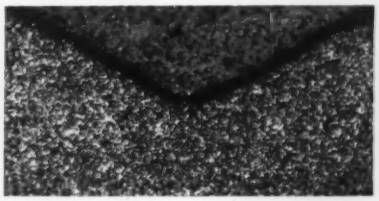
Here's why a High-Torque UNBRAKO can be seated tighter—and stay put

UNBRAKO SET SCREW



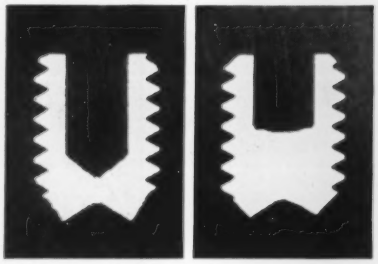
It has fully formed threads that make the whole screw stronger. The metal is compressed into the closely knit grain structure that you see in this illustration. The grain flow follows the contour of the threads. There are no straight lines along which shear can occur. The UNBRAKO retains its flow lines even when ground down to .010 in. below root diameter. Screws with cut or ground threads lose thread form at root diameter.

UNBRAKO SET SCREW



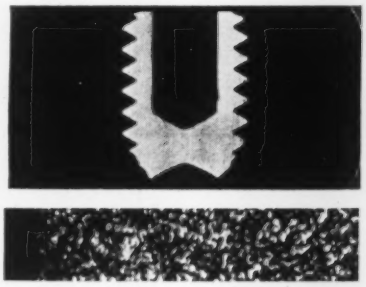
The High-Torque UNBRAKO has a radius in the socket corners. This eliminates the sharp corners where cracks start. It also distributes the stresses developed when tightening torques are applied. Ordinary socket screws have sharp corners which often crack when tightened even at lower torques than those recommended for UNBRAKO.

UNBRAKO SET SCREW **ORDINARY SET SCREW**



The High-Torque UNBRAKO has a deeper socket, which gives you more purchase with the wrench. Since more wrench can be put into the UNBRAKO socket, you can set the screw much tighter. And you won't ream the socket or round the corners of the wrench.

UNBRAKO SET SCREW

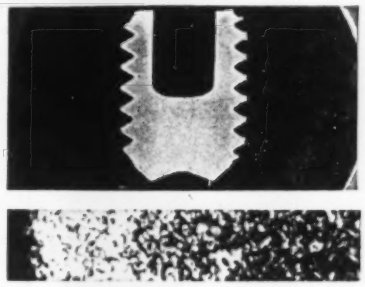


The High-Torque UNBRAKO is properly heat treated, kept clean. Its grain structure is uniform. It is free of decarburization. There's no danger of stripping the threads or shearing the point when tightening

High-Torque UNBRAKO socket set screw tight

and key assures full *high-torque* performance

ORDINARY SET SCREW



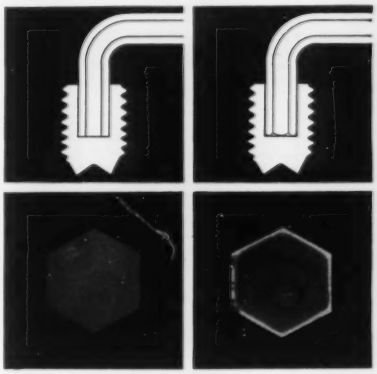
torques are applied. The ordinary screw is suffering from an overdose of decarburization; socket walls, threads and point are full of the telltale white spots that identify it.

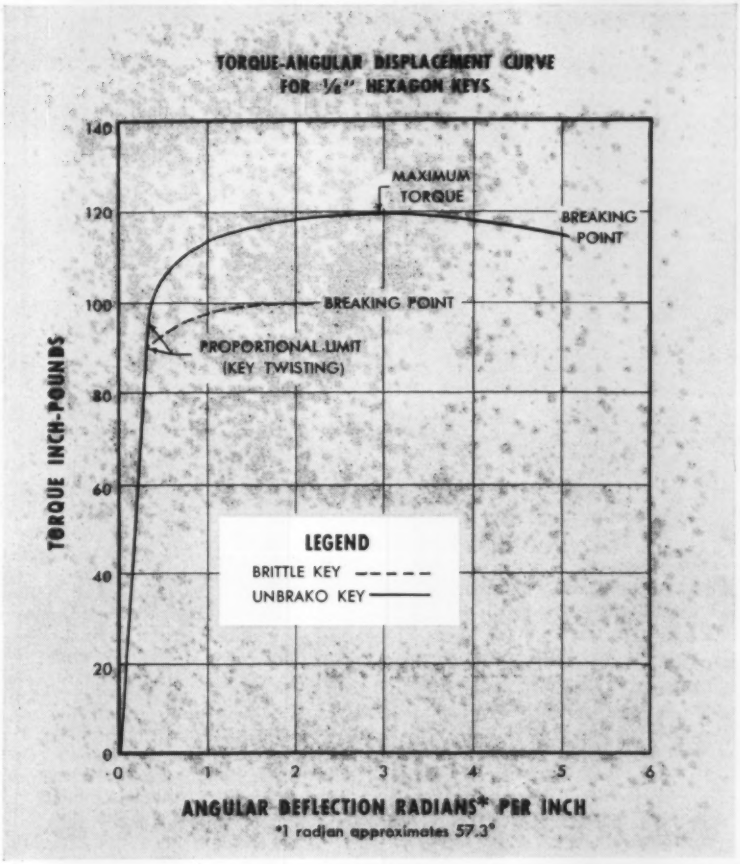
And here's why an UNBRAKO High-Titan hex key can be used to apply far more tightening torque to a High-Torque UNBRAKO socket set screw than is needed without damaging either the screw or the key.

The High-Titan UNBRAKO is not an ordinary hex key. It is a precision internal wrenching tool with high ductility, specially designed to assure full high-torque performance. It is made of special alloy steel bar stock, inspected magnetically and chemically to make sure that the material is flawless and of the specified properties. Its sides are flat and parallel. The corners, which exert torque on the inner walls of the socket, are sharp and tough. The bend is strong.

The High-Titan UNBRAKO is accurately sized across the flats and across the corners to insure snug fit and full wall contact. It won't ream or wear an UNBRAKO socket. The square cut end engages the full depth of the socket for greater tightening power. It gives you up to 25% more wrench engagement than a key with a chamfered end.

UNBRAKO KEY **CHAMFERED END KEY**





The High-Titan UNBRAKO hex key is heat treated in modern atmosphere-controlled furnaces. The surface is casehardened without decarburization. The extra hard surface gives the key longer life. And it retains its dimensional accuracy, is tougher and more ductile than ordinary keys. This torque-angular displacement curve for 1/8 in. hexagon keys distinguishes a High-Titan UNBRAKO from an ordinary key. The High-Titan UNBRAKO has a higher yield point and a higher breaking point—you can exert a much higher torque with it without snapping the key.

Be sure you get the full high-torque performance offered only by the combination of a High-Torque UNBRAKO socket set screw and a High-Titan UNBRAKO hex key. Both products are stocked by authorized industrial distributors. Ask the one nearest you for complete information. Or write STANDARD PRESSED STEEL CO., Jenkintown 33, Pa.

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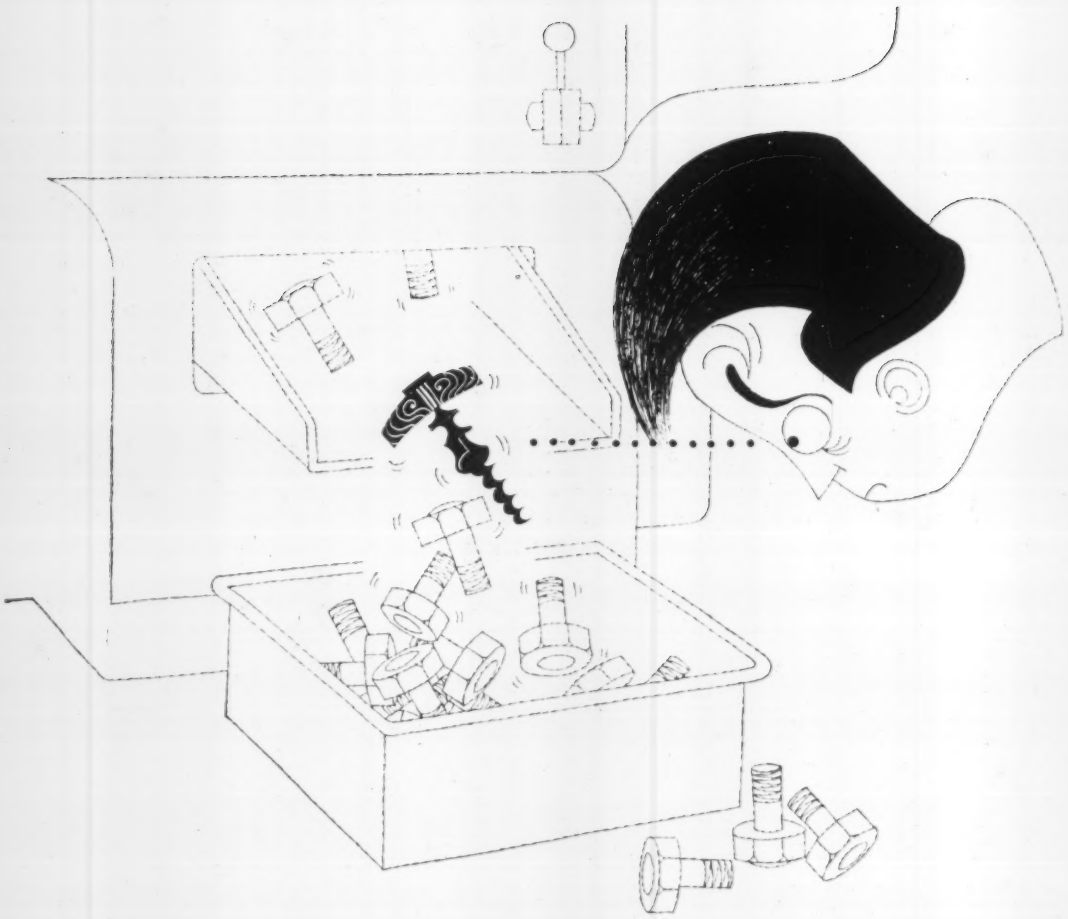

Got a cold heading problem?

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You can get the wear- and shock-resistance you need with Crucible Sanderson Extra Tool Steel—an electric furnace melted, high quality water hardening tool steel. This general-purpose steel develops a hard, wear-resistant case and has a tough supporting core which provides excellent shock resistance. These are the qualities you need for all types of striking, blanking and forming dies, punches and reamers—and you get them in every piece because Crucible's rigid melting and processing standards ensure uniform quality always.

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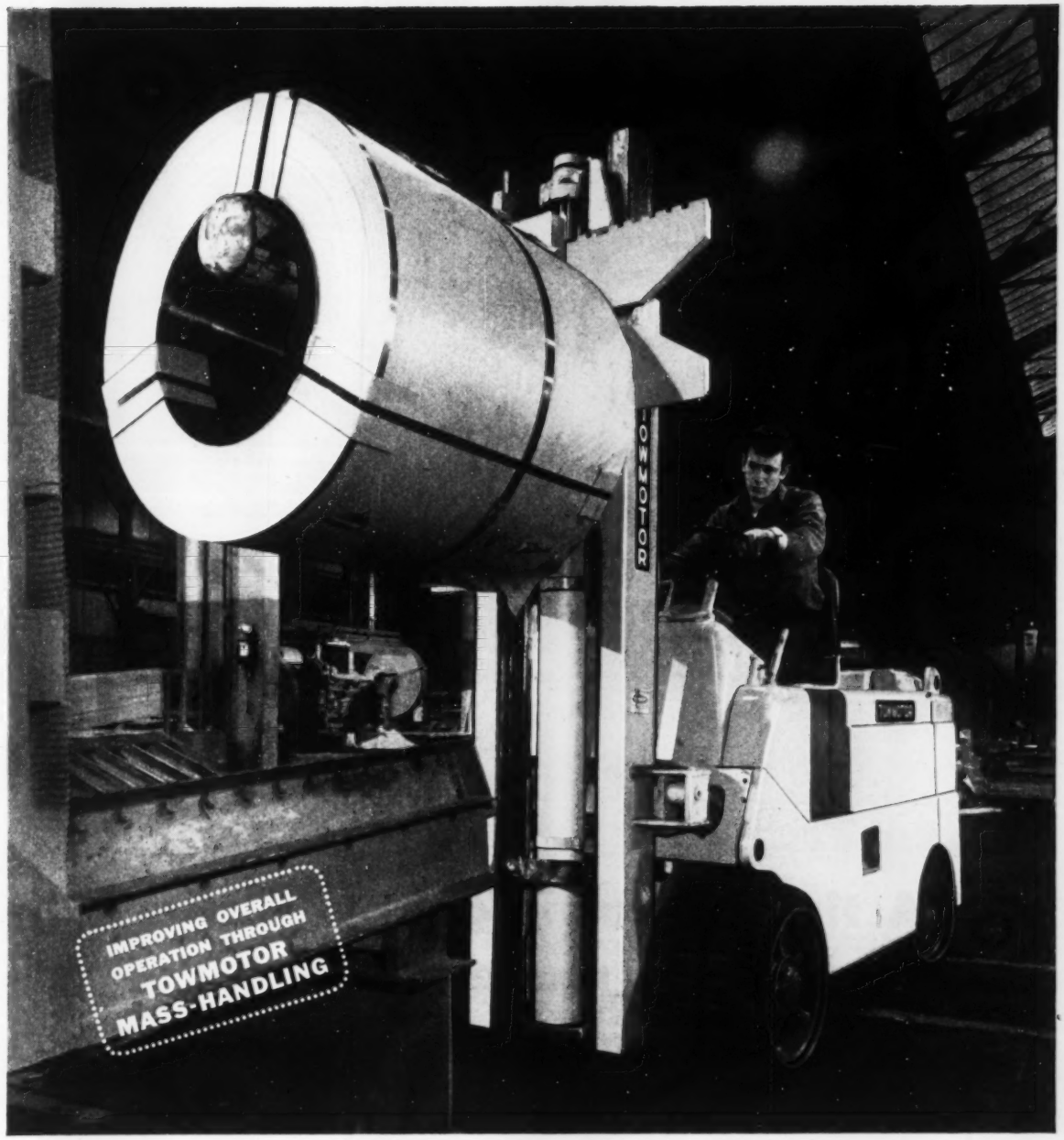

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You get an entirely new concept of modern mass-handling. You get a "bonus" in extra profits because you multiply manpower with the payroll you have. And you get a bonus in plant-wide morale when work flows on-schedule through every department . . . effortlessly . . . with a bigger day's work done.

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Power steering, 'TowmoTorque' Drive at extra cost

These and 60 other points of superiority are described in Towmotor booklet SP-23 for comparison. Get a copy from Towmotor Corporation, Cleveland 10, Ohio.

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A timely warning from nickel might have made a difference

The sea seldom offers a clue to what lurks beneath its surface. But man can find out.

He beams sound waves to the ocean floor. And listens as they come bouncing back. The technique is called "echo sounding." It's the modern way to probe the depths . . . to map sea-bottom contour . . . to locate schools of fish . . to avoid reefs and other underwater obstructions.

One of the principal types of instruments (the fathometer) used in echo sounding depends on nickel for sending and receiving the telltale waves. Nickel, you see, has a rather unusual physical property called *magnetostriction* . . .

This simply means that it changes dimensions when exposed to a magnetic field. And it can be made to contract and return to its original dimensions rapidly enough to generate powerful sound waves.

Of course, nickel has other useful properties. Strength and toughness, for example. Resistance to corrosion. Electrical conductivity. But *magnetostriction* is the vital one here. And nickel is about the only readily available metal that offers so much of it.

Do you have a metal problem? Whether or not it involves some unusual factor like this one, write to us about it. Let's see if nickel — or one of our many Inco Nickel Alloys — will supply the properties *you* need to do the job you want done.

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Whenever you are looking for answers to your metal problems, all the information and help we can give you are yours for the asking. For instance . . .

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Nickel Alloys Perform Better, Longer

Metalworking Outlook

Atomic Business Slow

The atomic energy industry doesn't have enough business to keep all companies in it operating at even near capacity, Stanley B. Roboff, Sylvania-Corning Nuclear Corp., Bayside, N. Y., told the Atomic Industrial Forum in New York. He suggests this marketing program to stimulate sales: 1. Surveys and appraisals of the long and short range markets. 2. Wider contacts with all possible customers. 3. Greater capitalization on the growing overseas market. Dr. L. L. Davenport, Sylvania-Corning president, lists other "disturbing factors" in the nuclear field: Inadequate profit, high capital requirements, skilled personnel shortage, inadequate patent protection. He advocates standardization of reactor designs, relaxation of security provisions, more reasonable tolerance in engineering and design specifications.

Turnabout in Defense Spending?

There's little concrete evidence of a switch to a $40 billion to $45 billion Defense Department budget for fiscal 1959 (the $38 billion to $40 billion range is now in vogue), but some weathervanes in Washington point in that direction. Hints of things to come: Defense Secretary Neil McElroy's quick action on money for research and development (rescinding an order to cut R&D spending by 10 per cent) and the Air Force's announcement that it would pay bills on time. The Pentagon also reveals that current spending is $400 million above the $38-billion level.

Ike's Considering It

While economy-minded forces on Capitol Hill maintain a guard hard for missile enthusiasts to break, the White House could gage public opinion this way: 1. The public doesn't want the U. S. to stay behind Russia in the headline-grabbing sputnik department. 2. Neither do our allies overseas. 3. We could get a few extra billions for defense by foregoing a tax cut, limiting social programs like school construction, reducing farm payments, and increasing postal revenues. Some Washington observers regard Vice President Nixon's recent San Francisco speech as a test of public opinion: He hinted that tax cuts might not be possible next year because of increased defense spending.

Missile Investigation Underway

Rep. George Mahon's (D., Tex.) Defense Appropriations Subcommittee started hearings last week at the Air Force's Ballistic Missile Div. in Inglewood, Calif. Working at the hub of our ICBM program (Ramo-Wooldridge Corp. is the Air Force's weapons system manager), the subcommittee will probably come up with the closest look Congress will get at our latest re-

search in missiles. Representative Mahon is already on record as willing to give the Pentagon whatever it thinks necessary to do the job right.

Kefauver Will Probe Auto Prices

Sen. Estes Kefauver (D., Tenn.) will next investigate why 1958 auto prices are higher. The Big Three of autodom have already been contacted by the Antitrust & Monopoly Subcommittee's staff. Walter Reuther will testify. The auto probe will begin this month. It'll be followed, probably, by a look at prices in the aluminum, can, roofing, and farm equipment fields.

GM To Start Publicity Plan on UAW Demands

General Motors Corp. at the turn of the year will start an extensive campaign to educate its employees and the public on the problems raised by expected United Auto Worker demands for the short week, higher wages, and other issues. The program indicates a GM decision to be tough about 1958 bargaining. Labor experts around Detroit guess that GM will be the prime union target next year.

St. Lawrence 80% Finished

The St. Lawrence Seaway and power project are 80 per cent complete. The Long Sault Canal, which will enable ocean-going freighters to enter the Great Lakes, will open next July, although it won't operate at full capacity until the spring of 1959 because of dredging problems.

ICC Would Rule on Rail Merger

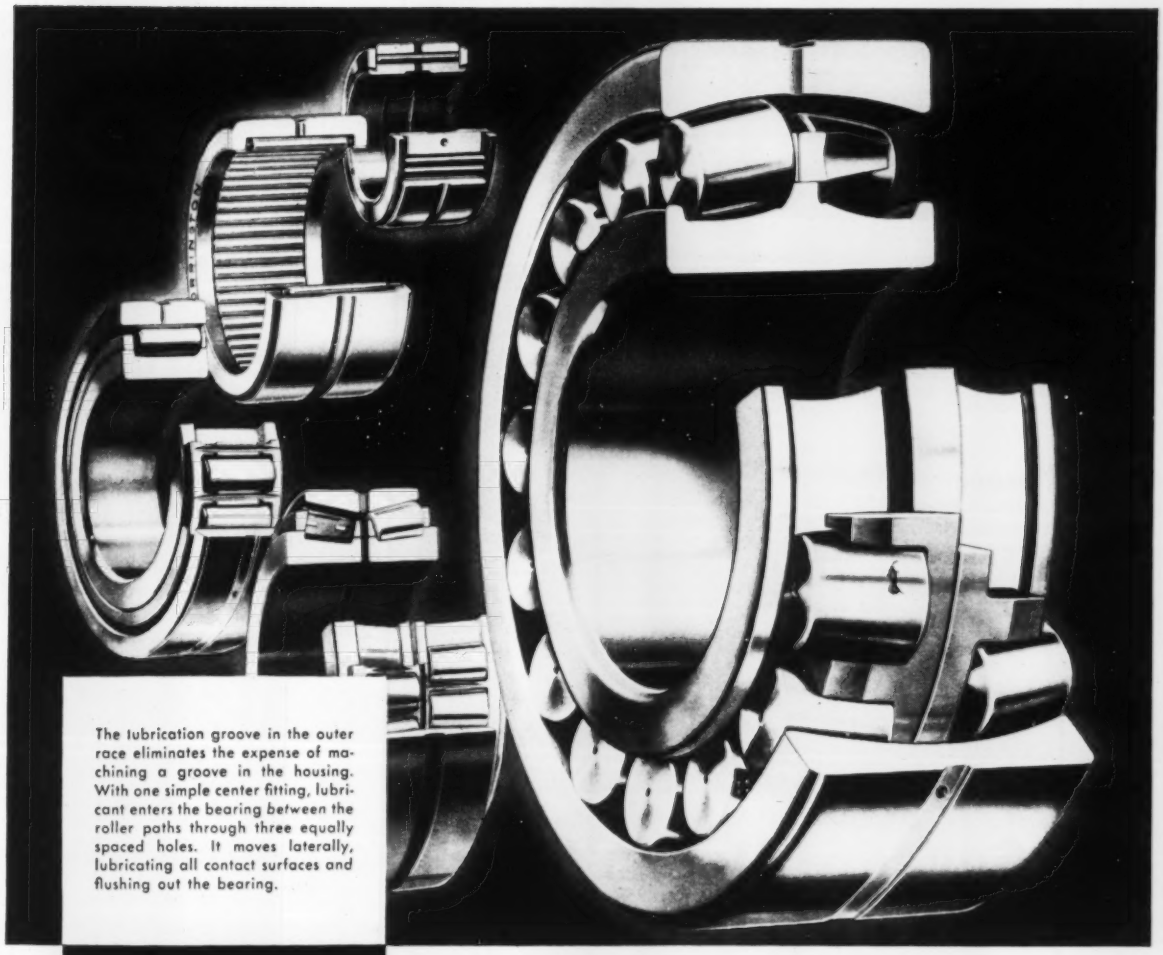
The Interstate Commerce Commission would rule on the merger of the Pennsylvania and New York Central railroads, if it's ever formally proposed. If the ICC approves, the plan would be immune from the antitrust laws. Other railroads considering merger are the Erie, Delaware & Hudson, and Delaware, Lackawanna & Western.

Tool, Die Business Spotty

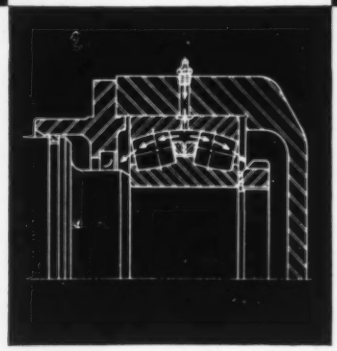
Tool and die makers attending the National Tool & Die Manufacturers Association convention report: Missile business on the West Coast and in Connecticut is picking up; in Detroit and Philadelphia, work on 1959 model auto dies will start within the next 60 days (an increase of up to 30 per cent over the 1958 die business is expected). Elsewhere, layoffs and reduced workweeks are common.

Straws in the Wind

About $400 million will be spent this year by American business for consulting services . . . Industry is spending some $130 million a year on air pollution control . . . Four out of five U. S. households have one or more television sets . . . The 1957 soft coal production will total 498 million tons, compared with 502 million in 1956.



The lubrication groove in the outer race eliminates the expense of machining a groove in the housing. With one simple center fitting, lubricant enters the bearing *between* the roller paths through three equally spaced holes. It moves laterally, lubricating all contact surfaces and flushing out the bearing.



A time-proved lubricating method now available on Torrington Spherical Roller Bearings

The circumferential groove in the outer race has met the test of experience in many Torrington Bearings, including Heavy Duty Needle Bearings, Aircraft Type Needle Bearings, Tapered and Radial Roller Bearings. Now the circumferential lubrication groove is available in Torrington Spherical Roller Bearings.

This design feature makes it possible to introduce lubricant *between* the roller paths without the expense of machining a groove in the housing. This groove is proportioned to provide generous lubricant flow capacity. Lubricant moves through the roller paths, flushing used lubricant and contaminants away from bearing contact surfaces.

Torrington Spherical Roller Bearings in many sizes may be ordered with this groove as desired at no additional cost. For further information, see your Torrington representative or write: **The Torrington Company, South Bend 21, Ind.—and Torrington, Conn.**

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Take advantage of the high strength and light weight of corrosion-protected Armco Welded Steel Tubing in products or parts *you* make.

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Satire on Retirement

The age of retirement is one of the most debatable and confusing problems of the day. As a relief from the usual treatment of the subject we recommend Prof. C. Northcote Parkinson's *Parkinson's Law*. (Houghton Mifflin Co.).

The professor finds that the age of compulsory retirement varies all over the lot—from 55 to 75, and, without exception, it is arrived at by arbitrary and unscientific methods. But he has discovered that one constant is present in all plans. Involving the time at which mental powers and energy show signs of flagging, it is expressed as R minus 3. For example, if retirement is fixed at 65, the candidate starts to slip at 62; or if the magic number is 60, slippage begins at 57.

This is an interesting fact, says the professor, but it is not helpful in deciding what R should be. The observation that some men are old at 50 and others are energetic at 80 or 90 also leads nowhere. The man to watch, says Professor Parkinson, is not the man being considered for retirement (X) but (Y), the man destined to replace him. It requires investigation of the stages a man goes through in a successful career. They are:

1. Age of Qualification = Q.
2. Age of Discretion = D(Q plus 3).
3. Age of Promotion = P(D plus 7).
4. Age of Responsibility = R(P plus 5).
5. Age of Authority = A(R plus 3).
6. Age of Achievement = AA(A plus 7).
7. Age of Distinction = DD(AA plus 9).
8. Age of Dignity = DDD(DD plus 6).
9. Age of Wisdom = W(DDD plus 3).
10. Age of Obstruction = OO(W plus 7).

The numerical value of Q is the age at which a professional or business career begins. It will be seen that if Q equals 22, X will not reach the age of obstruction until he is 72.

The problem, however, centers not on X but on Y, his heir apparent. The professor's inquiries tend to prove that the age gap between X and Y is 15 years. Taking this average and assuming that Q equals 22, we find that Y will have reached AA at 47 when X is only 62.

That is the moment of crisis. Y is thwarted in his ambition because X still retains control. Y's career takes a new turn:

6. Age of Frustration = F(A plus 7).
7. Age of Jealousy = J(F plus 9).
8. Age of Resignation = R(J plus 4).
9. Age of Oblivion = O(R plus 5).

So when X is 72, Y is 57, just entering on the age of Resignation. Should X retire at 72, Y is quite unfit to take his place. After a decade of frustration and jealousy, he is resigned to a career of mediocrity. For Y, the opportunity is ten years too late.

The problem is to make X retire at 60 while he's still able to do the work better than anyone else. The change may be for the worse, but the alternative is to have no possible successor on tap when he finally goes.

The question is how to move X. This can be done by resorting to a custom once practiced by African tribes: That of liquidating the chief at a certain point in his career. The method depends essentially on:

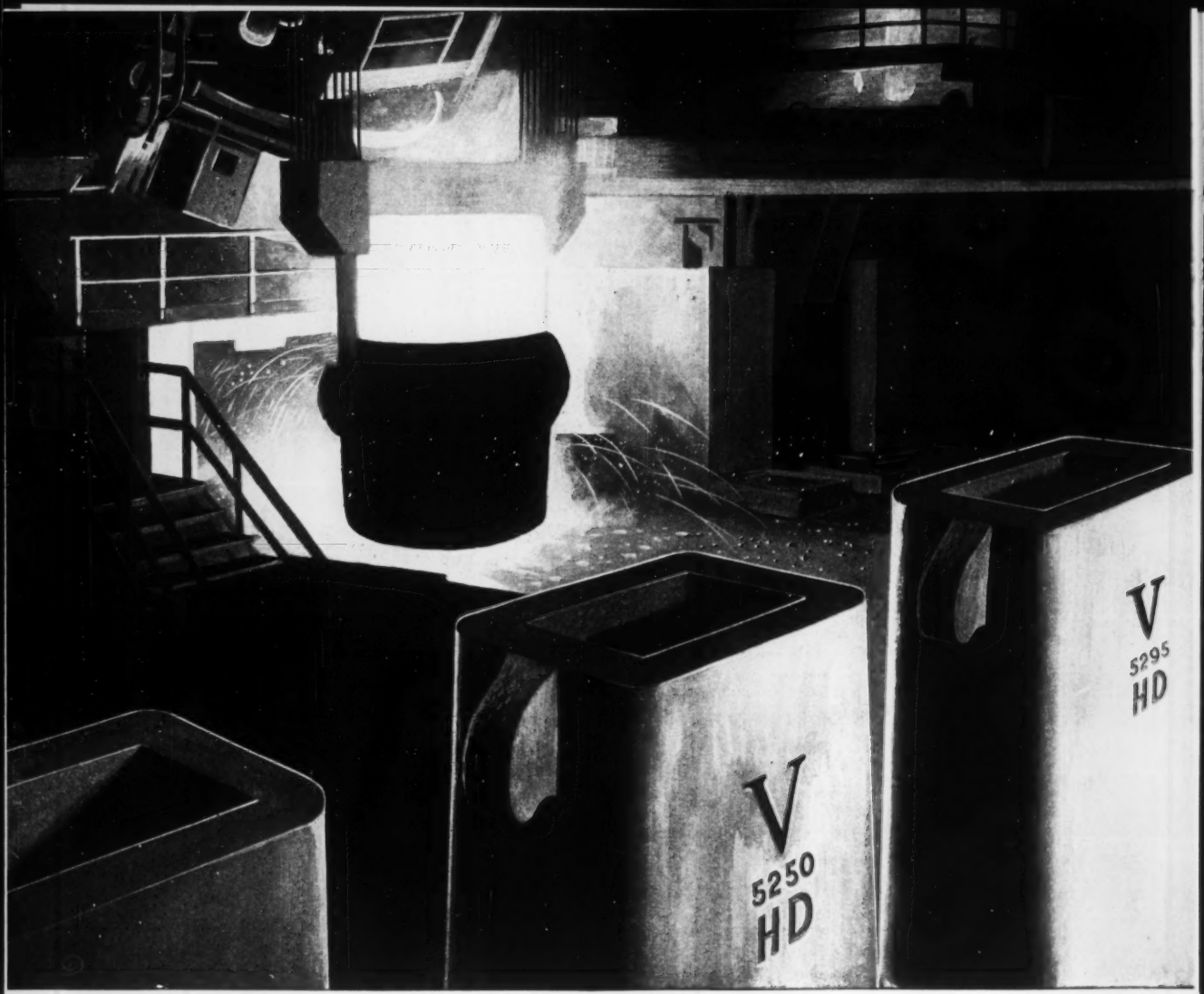
1. Air travel to conferences in faraway places.
2. The filling in of forms.

Given enough of each, the professor reports, the reluctant candidate for retirement will say "uncle" posthaste.

But a serious problem remains: What to do as we approach the retirement age we've fixed for others? It becomes obvious at once that our case is different. There is no possible successor in sight. We knew how to make our predecessors retire. When it comes to forcing our own retirement, our successors must find a method of their own!

Irwin H. Such

EDITOR-IN-CHIEF



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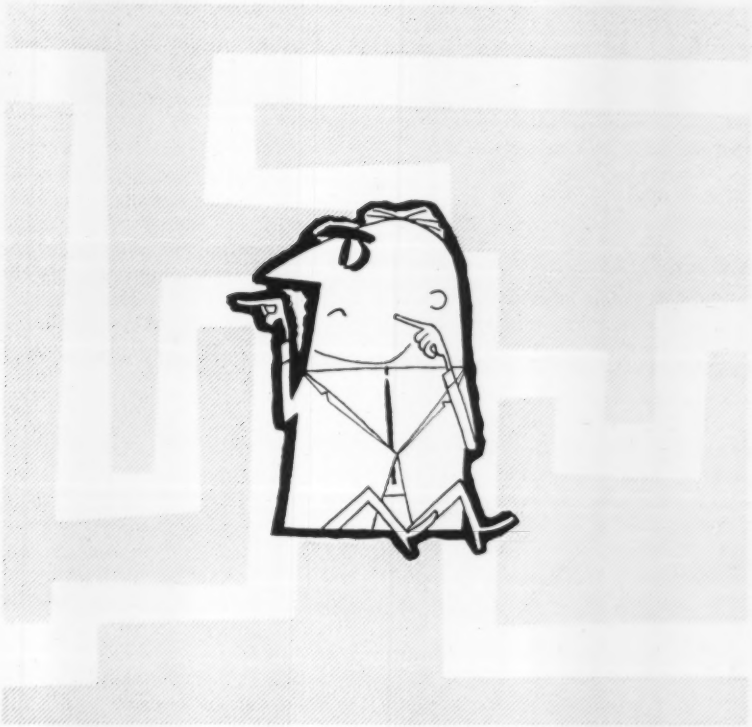


Metalworking finds itself in a maze as . . .

Pattern Bargaining Spreads

"WE AGREE to negotiate a contract similar to that of General Motors Corp."

So wrote a maker of auto parts to its union representatives during the 1955 negotiations with the United Auto Workers. It's an example of pattern bargaining at its worst. At best, pattern bargaining is no bargain.

The Pattern—Says Kenneth B. Porter, research director for Employers Association of Detroit: "Pattern bargaining—where the union tries to apply a contract formula for all companies whose workers it represents—is definitely on the increase." Says Ken Bannon, United Auto Workers' Ford director: "Of course, we favor pattern bargaining. We're after even more than we have now."

Two kinds of pattern bargaining predominate today, although there are modifications of each. First is the industry type as in steel or autos. Initially, the pattern was imposed just on basic steel or the Big Three auto companies. Now the unions are broadening out. United Steelworkers is trying to negotiate about 1200 contracts with metal fabricators this year so that they will expire on or about June 30, 1959—the expiration date for basic steel contracts. The strategy is obvious: Get as many as possible of the 1500 contracts in other than basic steel to expire at or near that time. It will clear the way for settlements patterned after the pace-setting steel agreements.

The second pattern type is the common agreement for most of the diverse companies in an area. Detroit and Youngstown are examples. In the Ohio city, an electronics manufacturer, an equipment maker, and an office furniture producer have the basic steel contract, modified only slightly.

Why the Pattern?—Because they are political organizations, unions like the pattern. It makes bargaining easier. All, or most, members will have the same pay ranges. Most companies accept a pattern because they have to.

Autonomy of the union locals braked the growth of the trend up to World War II. Until then, local labor leaders had more power and could get the internationals to accept independent agreements tailored for local situations. But labor has centralized rapidly in the past decade. Today, among metalworking unions local autonomy is rare.

Pattern Evils—What problems does the pattern cause? Because of it, the Youngstown metal furniture maker pays 30 to 80 cents an hour more for its labor than most of its competitors. Holley Carburetor Co., Detroit, has labor costs 10 to 20 cents an hour higher on its aircraft volume than its competitors. The Holley case illustrates another danger in pattern bargaining. In 1955, when it signed with the United Auto Workers, 80 to 85 per cent of its volume was automotive, 15 to 20 per cent aircraft. Today, its product mix has shifted drastically—it's nearly half aircraft. But the auto-pattern contract is still in effect.

Pattern bargaining influences the choice of plant sites, too. Since the end of World War II, some 90 per cent of Ford's expansion has been outside Michigan. High Detroit area labor costs are a major reason. The pattern has even forced some companies completely out of Detroit—or out of business.

To Break the Pattern—What can you do about the pattern? Four approaches stand out:

1. Give in, but offset the higher costs with higher efficiency. That's the most common reaction, but it takes a lot of expensive new equipment to boost productivity commensurate with current wage increases.

2. Move out, or expand elsewhere. Many companies are doing this and finding it a solution, for the short term at least. But how long will it take the union to catch up with the new plant in Arkansas?

Answers a bicycle manufacturer who has moved his operations to the South: "Maybe the union will never be able to organize me. But let's suppose that it does. If so, I know a lot more about bargaining today than when labor organized me in the 1930s. I won't make the mistakes which have haunted me for 20 years."

3. Bargain better. That's the best of the four approaches, but also the most difficult, points out Associated Industries of Cleveland. It involves year-round study of the industrial relations situation, not just hasty attention to it for 60 days before the contract is due to expire. It involves careful preparation, using wage and other facts for your area and your industry. It requires skillful negotiators. Employers' groups like AIC can offer valuable help on both preparation and negotiation.

If management does a good labor relations job, the pattern can be broken. General Electric Co. has demonstrated that with its policy of "going to the workers" the year round with the facts about the company and the labor situation. American Motors Corp. won an unpatterned agreement at its Milwaukee body works in 1955 because of a tough stand with the union local. Comments Edward L. Cushman, vice president for industrial relations at AMC: "As long as a union is convinced that you're not out to undermine it, you can do wonders with an honest presentation of your case."

But even with good bargaining, a small company or one in an area completely dominated by one union may have trouble breaking the pattern. Perhaps the answer is in Approach No. 4.

4. Bargain jointly with other companies. The divide-and-conquer method of bargaining is a standard union technique. In dealing with the Big Three automakers, the UAW makes clear that it will settle for a slightly more lenient package with the first company that will sign. Ford, Chrysler Corp., and AMC have all indicated they'd like to bargain jointly in 1958; GM probably doesn't want to. It believes it can bargain better; it doesn't want to be tied to some compromise. Therein lies the problem with industry-wide bargaining (the term used when companies band together for contract negotiations). Getting all the companies to agree to pool their efforts is like trying to mix oil and water.

Coal is one of the few American industries that even approaches industry-wide bargaining, but dissenters still are numerous. Basic steel saw the three largest producers bargain simultaneously in 1956, although the actual negotiations were technically separate.

The most practical route to a united company front in labor bargaining may lie in the local approach. Many successful coalitions already operate—the tool and die shops in Detroit, 160 manufacturing and machine shops in the San Francisco area represented by California Metal Trades Association, and a group of patternmakers in Cleveland.

Last summer the 160 California plants went through a 42-day strike with the International Association of Machinists when negotiations broke down with just one of the coalition members, Dalmo Victor Co., an electronics producer. The IAM demanded 25 to 50 cents more per hour, finally had to settle for 13 to 20 cents, plus another 11 cents, and a cost of living adjustment effective July 1, 1958. Some 20 members backed out and signed separately, but they employed only 370 of the 8000 involved in the strike.

Pattern Summary — Industry-wide bargaining is common in Europe, but it's difficult to achieve here. Better bargaining is the best approach to the pattern problem, supplemented under special circumstances by a joint company stand or by the threat to move the plant.

Pattern bargaining is a big reason why wages have risen so rapidly since the end of World War II, to outpace the rise in productivity. Comments one of the pattern's victims: "If we don't break the pattern, many of us will be priced out of business."

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service,* STEEL, *Penton Bldg., Cleveland 13, Ohio.*

Large Spider Assembly Requires Precision

A special 108-in. shaft spider assembly for a marine armature is machined at Hahn Mfg. Co., Cleveland. It is made from six spider plates welded radially to a central shaft. Machining operations, including both the shaft step turning and interrupted cuts on the welded spiders, are performed with carbide tooling on a 48-in. Monarch lathe

Because more than 500 representatives from 40 foreign countries attended the World Metallurgical Congress in Chicago last week, this "Welcome to America" luncheon was appropriate. Left to right are: Dr. Jacques Pomey, president, Societe Francaise de Metallurgie, Paris; G. M. Young, president-elect (1957-58), American Society for Metals, and technical director, Aluminum Co. of Canada Ltd., Montreal; I. W. Wilson, chairman, Aluminum Co. of America, Pittsburgh; and Dr. Donald S. Clark, president, ASM (1956-57). Standing is Charles M. White, chairman, Republic Steel Corp., Cleveland

Metal Show Attracts World

THE WORLD looks to the U. S. as the leader in down-to-earth practices in metalworking, despite Russian achievement with out-of-this-world sputniks.

More than 500 representatives of 40 foreign countries visited and participated in the National Metal Congress, National Metal Exposition, and Second World Metallurgical Congress in Chicago last week. Machinery and equipment made in several foreign countries was demonstrated, with the hope a market would be found for it in the big U. S. metalworking industry.

India Looks On—Prominent in numbers were representatives of India, where the steel industry is being expanded with several new plants and by the enlargement of its one present plant.

Emphasized — Despite the vastness of the show (around 500 exhibitors), it was easy to see that emphasis was on vacuum melting equipment, testing equipment for automatic lines (including ultrasonic testing and cleaning), and chemical milling.

A laboratory vacuum melting furnace on exhibit performed seven functions: Resistance melting, induction melting, annealing, degassing, heat treating, brazing, and sintering. It melted up to 12 lb of steel. Several models of its production counterparts were also shown. Trends in increased output, temperatures, and vacuum were noted.

Hitching to Automation—Exhibitors of cleaning and degreasing equipment emphasized the adaptability of their equipment to automatic lines.

Another recognition of the move toward automaticity was a demountable transfer device which automates straight side presses. The device enables one press to do the work of several. In one installation, the exhibitor reported it made it possible for one press to do the work of six.

Looking for Markets—Chemical milling companies were stressing the versatility of their process and its mass production capabilities. Adopted three years ago in the aircraft industry, the process removes metal by chemical rather than mechanical means. Its basic tools are a tank, a mask to cover surfaces that are not to be worked, and a chemical solution to dissolve the metal.

Two claims were made by an exhibitor of an oscillating carbide tool grinder that embodied an electrolytic method: Elimination of effort and fatigue of manual tool oscillation and an 80 to 90 per cent reduction of diamond wheel consumption.

No Hands!—A small, fully automatic diecasting machine that requires no operator was introduced. It produces zinc alloy castings weighing up to 1 lb at production rates often exceeding 1500 shots per hour. Operations include machine cycling, die cleaning and lubricating, inspection for foreign matter in the die, water control, replenishing molten metal, and picking off the castings.

Labor Saver—Pushbutton painting was demonstrated. The all-electric system uses the electrostatic principle. Exhibitors point out that only one operator is used.

Another company showed a high speed, low cost, hard facing process that does not use compressed air. Utilized are oxygen and acetylene or hydrogen gas.

Electronic Counters Gain

High speed instruments are no longer limited to recording production count. New functions include traffic control, inspection, data processing, and missile guidance

"THE BAKER'S DOZEN is a thing of the past now that predetermined counters are on the job at leading bakeries throughout the nation," says Potter Instrument Co. Inc., Plainview, N. Y.

There's no denying that counting devices are becoming increasingly useful. "They're being designed as parts of control, inspection, and data conversion systems, rather than as tools for recording production count," Potter explains.

Sales of counting equipment will approach $150 million this year, up 5 per cent from the 1956 level. Continued growth is expected in 1958. While the manufacture of counters requires relatively little steel, it involves large quantities of diecastings and stampings.

If electronics is the key to better production control, as one instrument maker suggests, it's also a major factor in the development of new uses for counters. Says a spokesman for Post Machinery Co., Beverly, Mass.: "Adaptation of electronics in design and operation broadens the scope of conventional counters, permitting higher speeds for unit counts and lineal footage."

Makers—Twenty-seven companies make electronic counters, and most of them were established within the last five years. Forty make counter-control devices—hand, mechanical, magnetic electrical, electronic, and pneumatic.

Counter-controls, many with computer components, give accurate data on number of pieces produced or handled, fluid flow volume, and length measurements. They use time, cam sequence, pulse frequency, revolutions, and stroke as basic operating factors. Any object that can break or change the intensity of a light beam is within electronic counting range.

Users—In steel mills and fabricating plants, electronic counters measure and cut to length wire, bar stock, strapping, and tubing. They shear strip material in this fashion: A friction wheel rides on the moving strip. With each revolution, an electromagnetic pickup generates a voltage pulse. When the counter receives the number of pulses corresponding to the desired strip length, it operates the shear. Another counter takes over, stacking the strips in exact quantities (see photo caption).

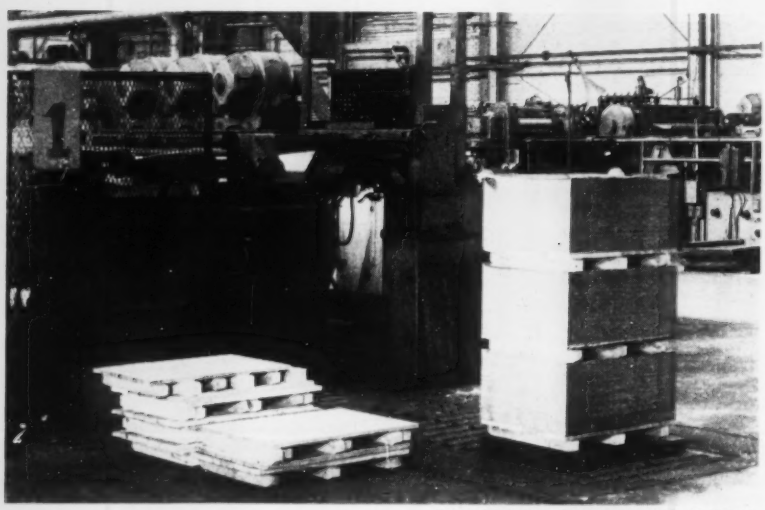
The textile industry is the leading user of lineal devices. A single knitting machine often has four counters. Other users: Manufacturers of paper, rope, sheet products, and coiling equipment.

Packaging—Electronic counters are especially useful in packaging operations. They place exact quantities of pills, capsules, and other small objects in bottles or boxes. Unit counting is replacing weight as the packaging standard. There's a trend toward designing special counters for original equipment.

"Precision electronic instruments can perform a variety of tasks, including counting, inspection, quality control, traffic control, and operator protection," says Edward J. Zeitlin, president, Standard Instrument Corp., New York. His firm produces photoelectric controls, time recorders, print-out counters, and predetermined electronic counters. Designed for maximum flexibility, the instruments regulate the manufacture of products as dissimilar as airplanes and zwieback.

Photoelectric control devices are usually integrated with tolerance, inspection, and safety factors. They're so sensitive that they reflect any change in light intensity as well as a break in the beam. When work or tools are out of alignment, the machine stops automatically.

Automation—The largest manufacturer of counting instruments, Veeder-Root Inc., Hartford, Conn., has introduced a series of counters for use in the rapidly growing fields of automation, control instrumentation, and electronic accounting. The instruments perform all functions of conventional counters and create an electrical circuit for remote reading or recording of data on printed forms. Veeder-Root began production at a new 110,000 sq-ft plant in Altoona, Pa., early this year.



Potter Instrument Co. Inc. and U. S. Steel Corp.

Predetermined electronic counter (black box, center) controls stacking of sheets. As sheets move down conveyor, they interrupt a photoelectric beam, feeding counts into counter. When required number of sheets has been stacked on one pile, deflector operates, feeding next batch into another pile

Presidents Made More in 1956

(Average compensation of chief executive officer)

Company Profit Ranges	Average: 18 Industries		Light Machinery		Heavy Machinery	
	1955	1956	1955	1956	1955	1956
$ 3 million	$ 71,500	$ 76,000	$ 80,000	$ 86,000	$ 76,000	$ 82,000
$10 million	$102,600	$108,000	$123,000	$115,000	$107,000	$105,000
$40 million	$155,700	$164,000	$195,000	$160,000	$152,000	$200,000

LIGHT MACHINERY:
Office equipment, components, home heating & plumbing equipment, home appliances, pneumatic tools, small electronic equipment, brass mill products, small fabricated items.

HEAVY MACHINERY:
Locomotives, other railroad equipment, hydraulic presses, machine tools, farm & construction machinery, large electrical equipment, printing equipment, industrial furnaces, oil well drilling equipment, pumps, compressors, elevators.

Source: McKinsey & Co. Inc.

Executive Earnings Rise

The trend is up in both salaries and fringe benefits. Light and heavy machinery officials make more than their counterparts in other metalworking industries

MOST metalworking executives got salary boosts in 1956. This is shown in a survey of 641 firms in 18 industries. (It was done by McKinsey & Co. Inc., New York management consultant firm.)

Chief executives in the light and heavy machinery industries head the list. (See table above.)

In general, the more money a company makes, the more it pays its executives. In some instances, the chief executive of a smaller firm was paid more than his opposite number in a larger company. Example: Most heads of light machinery companies received more money than those in heavy machinery, even though the heavy machinery category had larger sales, profits, and assets.

Dollars—Average compensation for the chief of a light machinery company was $97,000 in 1956 (64 firms reporting). It was a 4.2 per cent increase over the 1955 figure. The president of a typical heavy machinery firm didn't do quite so well: His 1956 pay check came to $92,000 (52 firms reporting), but it was 4.8 per cent better than he did in 1955. Both figures were above the average of the 16 other categories covered. A few industries, such as steel, were considerably higher.

In the few cases where lower salaries were reported, it was generally because a new man had filled the chief executive slot and was making less than his predecessor.

Compensation of lesser executives in light and heavy machinery also increased. Both industries paid their No. 2, 3, and 4 men about on a par with industry as a whole. Light machinery people earned a little more than their counterparts in heavy machinery. Proof: The average No. 2 man in light machinery made $67,800, the No. 3 man $56,500, and the No. 4 man $54,600. In comparable jobs, heavy machinery people received $66,000, $55,200, and $50,100.

Extras—Besides salary, most executives received supplemental benefits. Deferred contingent compensation was reported by 26 per cent of the executives in light machinery and 17 per cent in heavy machinery; 59 per cent in light machinery got stock options, versus 55 per cent in heavy machinery; 88 per cent in light industry had pension plans, versus 94 per cent in heavy machinery. The trend toward even greater supplemental benefits will continue, believes Frank Thompson, McKinsey consultant.

Good Business—Sales of light and heavy machinery showed a sharp gain over 1955 performance. The average light machinery firm took in $126.8 million, a 17.6 per cent increase. The average heavy machinery firm had sales of $143 million, a 16.1 per cent gain.

Profits were up, too. Light and heavy machinery ranked first and third in the average percentage increase in industry net profits. Average net earnings of light machinery companies jumped 18.9 per cent to the $7.4 million mark. Heavy machinery companies registered a 16.3 per cent gain and had average profits of $7.8 million.

Total assets in both industries rose, but not as much as the profit jump might indicate. The typical light machinery firm increased its assets to $87.6 million in 1956, a 9.6 per cent gain in a year. Heavy machinery companies reported average assets of $121.3 million, an 8.1 per cent rise.

George M. Humphrey sees more expansion ahead as . . .

National's Capacity Grows

"YOU ain't seen nuthin' yet."

George M. Humphrey uses those everyday words to bring home a big concept: The future of the steel and metalworking industries.

Admitting that recent expansion programs have pushed capacities above immediate consumption demands, the former secretary of treasury who returned to industry as chairman of National Steel Corp., Pittsburgh, predicts new expansion programs will be necessary within a few years.

"We never have stood still in this industry. I don't think we ever will."

For 1958—In his first public interview since leaving the President's cabinet to take the National Steel post, Mr. Humphrey predicted steel output in 1958 will be no less than it was in 1957. Ingot output will be in the 115 million to 117 million ton range, giving us one of the best years on record.

Thomas E. Millsop, National Steel president, pointed out that production in tons will be comparable to that of recent records, but steelwork operations expressed as a percentage of capacity will be lower. Mr. Millsop said the industry started 1957 with a capacity of 133.5 million tons. At present, it is about 138 million tons. Sometime in 1958, it will reach 143 million tons as facilities now being built are brought into production.

On the new capacity basis, Mr. Millsop says, 80 per cent operations will produce as much steel as 100 per cent operations did a few years ago.

More Efficient Capacity — Mr. Humphrey acknowledged that capital expenditures for industrial expansion are letting down. He expects the trend to continue into 1958. He emphasizes that the need for keeping present capacity modern and efficient will be a big support for the economy. Capital goods makers will find a fairly strong market for their products in keeping the industrial machine up to date.

National Steel is rounding out an expansion program that represents an outlay of half a billion dollars from 1952 through 1957. The program will increase National's ingot capacity by a million tons. When it is completed, National's steelmaking divisions, Great Lakes Steel Corp. and Weirton Steel Co., will be able to produce more than 7 million tons of ingots annually.

Consolidating Gains—Mr. Humphrey says National Steel has no immediate or definite plans for further expansion programs. The corporation's next step will be to get its new and revamped facilities into high gear. A study of national needs and markets will continue.

National does not have any plans to enter into the production of new types of steel products. Most of the corporation's facilities are designed for the production of light flat-rolled steel.

National Steel has two sites that could be used for new plants in the future. One includes 2150 acres in the Delaware River Valley near Philadelphia and the other 750 acres at Chicago. Mr. Humphrey gave no indication that definite plans for building at either are being considered.

Double Iron Capacity—The expansion program at Great Lakes has doubled coke and iron production at Zug Island. The 148 coke ovens added have the capacity to carburize 3800 tons of coal a day.

The program includes the construction of one new blast furnace and the complete rebuilding of another. The rebuilt furnace has a hearth diameter of 30 ft 3 in. and is 110 ft high.

Under construction and scheduled for completion next spring is a new 7200-ton per day sintering plant.

Giant Furnaces—National has taken the lead in building big open hearths. Great Lakes has 14 furnaces of 500-ton capacity and three smaller units. Weirton has some 600-ton units.

To obtain maximum efficiency in its large open hearths, the company incorporates the bessemer converter with the open hearth process. Blown metal is charged into the big furnaces, materially increasing production.

Next Price Increase — When asked whether steelmakers will increase prices next July when an automatic wage hike becomes effective under the industry three-year contract with the United Steelworkers, Mr. Humphrey opined that at least some of the increased costs would have to be passed along to the steel buyers.

"Over a period of time we can count on increases in productivity to afford increases in wages. But when they happen too fast, there is no alternative to increasing prices."

Mr. Humphrey stuck to this opinion last week when he refused to agree with Senator Kefauver (D., Tenn.) that National should cut prices now to combat inflation.

He told the Senate subcommittee, investigating the $6-a-ton steel boost last July, that he had not changed his beliefs. Inflation must be checked, he said, but his company is "not prepared to make any changes whatever in its prices at this time."

National was forced to increase prices to retain its competitive earning position in the industry, Mr. Humphrey told the senators, adding that he could think of no reason why his company should not do its best to make more money than its competitors.

He said the steel boost meant about $1 to a family that uses 1000 cans of food a year, and $8 to $10 more for a car that costs $2000 to $4000.

Bethlehem's Grace Retires

At 81, "grand old man" of steel industry turns over reins of nation's second largest steelmaker to A. B. Homer. Now honorary chairman, Mr. Grace will continue as director

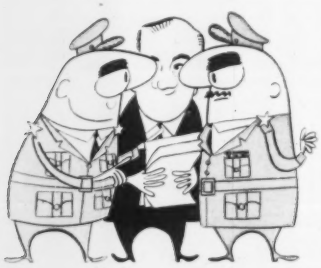
COLORFUL and energetic, but ailing, Eugene G. Grace, for 12 years chairman of Bethlehem Steel Corp., retired on Oct. 31. A. B. Homer, who served as president throughout Mr. Grace's term as chairman, was made chief executive officer in time to report a record nine-month net income of $143,752,627.

Engineer—Born Aug. 27, 1876, in Goshen, N. J., Mr. Grace received a degree in electrical engineering from Lehigh University in 1899. He immediately went to work for Bethlehem, where he was put in charge of an electric crane. He became superintendent of yards and transportation in 1902. In 1906, he went to Cuba to reorganize the firm's ore properties.

Executive — He was appointed general manager of Bethlehem Steel Co. in 1908 and became its president in 1913. Three years later, he became president of Bethlehem Steel Corp. He served as chairman since Dec. 20, 1945.

Leader—Mr. Grace was president of AISI in 1935-36 and is still a director. His many honors include the AISI Gary Medal in 1934, the Bessemer Medal from the Iron & Steel Institute of Great Britain in 1942, and the Rand Medal from the American Institute of Mining & Metallurgical Engineers in 1948.

His Successor—Mr. Homer, 61, started with Bethlehem in its Quincy, Mass., shipyard in 1919. He is a vice president and a director on the executive committee of AISI. During his presidency, Bethlehem's annual rated capacity has grown from 12.9 million to 20.5 million tons.



New War Plans Coming from JCS

SOURCES around the Commerce Department and the Office of Defense Mobilization say the joint chiefs of staff will hand down new war plans around the first of the year. The information is not received with as much enthusiasm as you might expect. In the past, the joint chiefs have failed to give defense mobilizers a really solid idea of what they want on the basis of what war they expect. However, with Sputniks I and II whizzing over our heads, the folks who do the war preparation paper job have high hopes of getting some concrete requirements to work with.

Many of these men who must deal directly with industry on war mobilization have been as much in the dark about our planning as the man in the street.

What is needed, they indicate, are specific directions from the joint chiefs on how it expects to fight:

1. An all-out nuclear attack. 2. A limited war with small nuclear arms. 3. A general war with small nuclear arms. 4. Another Korea (no nuclear weapons).

If the joint chiefs will state general policies on how to approach the situations, ODM and Commerce can do their jobs.

What Stockpiling Committee Means

The interest in war plans is sharpened with the work ODM's stockpile advisory committee is doing (STEEL, Nov. 4, p. 192). Headed by Holman Pettibone, Chicago banker, the committee includes many men well versed in the problems of World War II and Korea and scientists who may be expected to understand the latest developments in nuclear weapons and missile materials. It has already established a working relationship with the National Science Foundation's Materials Committee. A spokesman indicates the ODM committee is a co-operative effort designed to give Defense Mobilizer Gordon Gray the latest thinking on stockpiling problems.

Six federal departments (maybe more later) form a backstopping advisory group for the committee. The six are: Defense, State, Commerce, Interior, Agriculture, and the Federal Civil Defense Administration. Working behind closed doors for the last several weeks, the committee's staff has established liaison with these departments and interested committees on Capitol Hill.

Full Review: Some New Concepts

The committee is conducting a full review of our stockpiling program and presumably relating that to our whole mobilization effort. The committee ranks its problems: First, additions to the stockpile; second, retention or disposal of materials already stocked. The whole committee will meet at least three times by year's end. A small staff is doing the digging job in Washington. A report to Mr. Gray is due "as soon as possible" after Jan. 1.

Some new concepts have come out of this committee, perhaps recommendations for legislation, too. In the past, we have simply stocked critical materials for one type of war of a given length. Several industry advisory groups, and companies, have been critical of our mobilization efforts.

Says one source close to the committee: "We know the direction we want to go; a reorientation of our thinking may be necessary."

Of most immediate concern to metalworking are the buying programs for nonferrous metals and Uncle Sam's huge supply of machine tools. Chances are that the committee and ODM will continue to approach both problems with extreme caution. In today's economic climate, there will be no wholesale dumping of materials or machines. But there may be much slower buying programs.

Of more interest to metalworking will be the committee's recommendations to buy some of the newer glamour metals and advice on how to produce them in greater quantities.

'Bold New Approach'

In the same context, last week Sen. Lyndon Johnson (D., Tex.) called for "a bold, new approach" to our thinking on defense problems. He made the appeal at the Pentagon just before joining Sen. Richard Russell (D., Ga.) and Sen. Styles Bridges (R., N. H.) for a special briefing by top defense officials. The three senators will lead the armed services committee in the investigation of our missile program. Senator Johnson reports his preparedness investigating subcommittee has completed preliminary research. Formal hearings will begin this month.

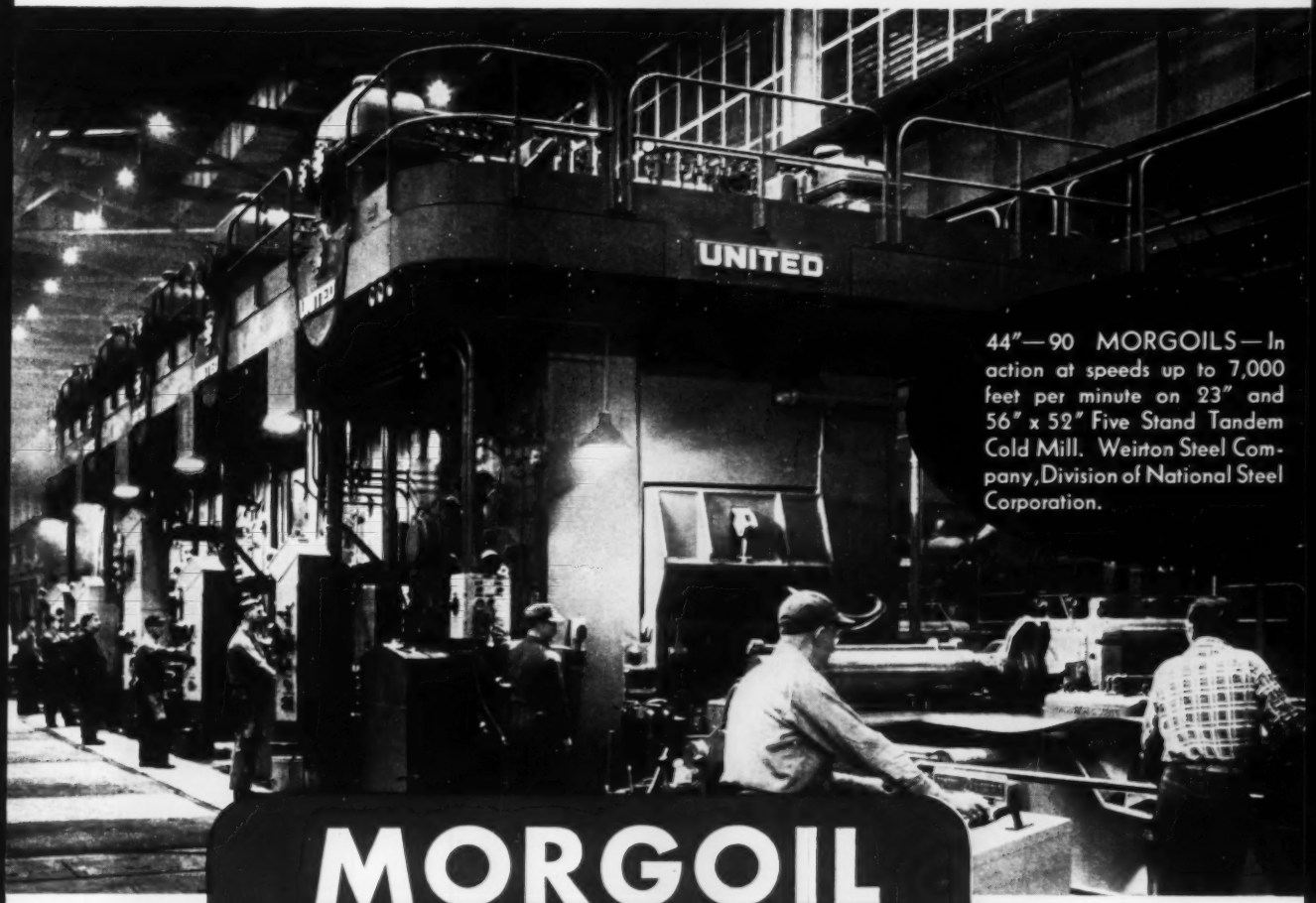
Top level meetings of the National Security Council at the White House are in the same area. The administration is desperately trying to work out a new defense look, yet keep it in line with a fiscal 1959 budget of less than $73 billion.

Investigations Will Be Messy

Several congressmen are warning that the investigation will be the "'messiest" in years, with Democrats and Republicans alike demanding to know exactly where the U. S. stands as a world power in missiles and atomics.

Heads will roll at the Pentagon if some willing witnesses are allowed to testify. In addition, U. S. industry will be in for some criticism.

For HIGH CAPACITY at ANY SPEED



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ROLLING MILLS MORGOIL BEARINGS GAS PRODUCERS
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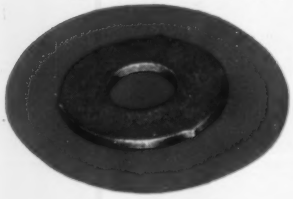
when buying HIGH-STRENGTH STRUCTURAL BOLTS AND NUTS

LAMSON High-Strength Bolts and Nuts

1 LOOK FOR THESE SYMBOLS ON THE HEAD

The three radial marks and the "A-325" indicate that the bolts meet the latest ASTM specifications for High-Strength Structural Bolts. The "L" on the head identifies the bolt as manufactured and *guaranteed by* LAMSON & SESSIONS.

2 LOOK FOR THE NUBS ON THE WASHERS



The nubs on the washers show that they have met the specifications laid down by ASTM.

Look for the three nubs on the perimeter of the washers you buy . . . and be *sure* of ASTM quality.

3 LOOK FOR THE ARCS ON THE NUT

The three long indented arcs on each end of the nut indicate that it meets with the latest ASTM specifications.

The three short dashes between the arcs are a Lamson & Sessions trademark . . . your assurance that you are getting Lamson *proven quality*.

Play *safe* and *sure!* Specify Lamson & Sessions High-Strength Bolts and Nuts *every time* you buy.

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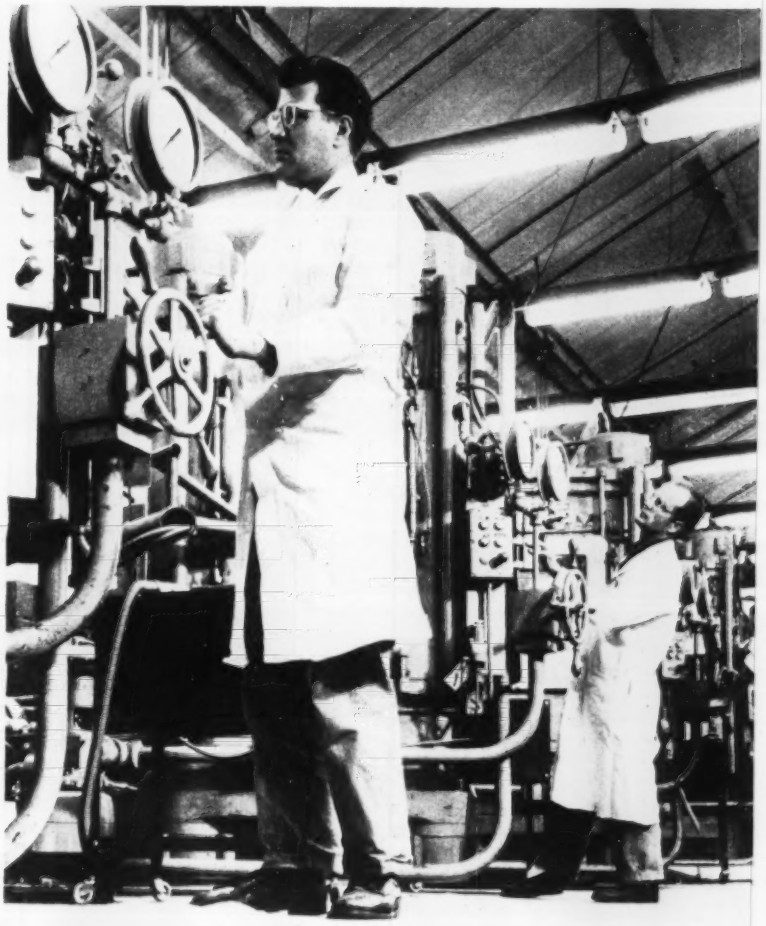

Such machines will be at work next year, turning out . . .

Manmade Diamonds from GE

GENERAL Electric Co.'s Metallurgical Products Dept., Detroit, plans large scale production of industrial diamonds next year.

Eventually, GE hopes to supply at least half the industrial requirements of the U. S. The manmade stones have all the qualities of their natural counterparts.

Fast Start—About 100,000 carats have been made in pilot plant production since the company first announced (February, 1955) it had learned how to make diamonds, says Kenneth R. Beardslee, GE general manager.

The stones range from 60 to 600 grit (the equivalent of fine to coarse grains of sand). Mr. Beardslee says the diamonds cost $4.25 per carat, compared with $2.85 for imported natural bort (grit). This year, 7 million carats in the 60 to 600 grit range will be imported from Belgian Congo and South Africa.

Insures Supply—The number of carats we import is allocated by a diamond syndicate, which controls shipments throughout the world. (An extra U. S. allocation is stockpiled for defense needs.)

In interpreting the importance of this domestic source, Mr. Beardslee points out that the size range of GE's product meets more than two-thirds of the nation's industrial requirements. Some major uses: Machining operations, grinding, lapping, and cutting tools.

Uses Growing—Charles J. Koebel, president, Koebel Diamond Tool Co., Detroit, recently told the American Society of Tool Engineers that low cost diamonds weighing about 1/50 of a carat will do jobs which once called for stones as large as 20 carats.

The Koebel firm and Jones & Lamson Machine Co., Springfield, Vt., have developed processes and tooling which can use small diamonds (like GE makes) in cutting tools.

In an experimental run, a diamond cutter was used to dress a series of grinding wheels. After handling 167 miles of surface on 15 resinoid wheels (over 124 hours of machining), wear on the cutter was only 0.0003 in., says Mr. Koebel. Jones & Lamson is offering nonexclusive, nonrestrictive licenses for the use of the cutters and processes.

Potential Uses—John D. Kennedy, manager of GE's diamond section, suggests other uses.

Example: Ford Motor Co.'s glass plant uses 28 to 32 grinding stations. Carbide wheels (12 in. in diameter) are used to polish large sheets of plate glass.

Extrahard industrial diamonds should increase the life of the wheels and possibly reduce the number of grinding stations to eight. Mr. Kennedy thinks the glass industry could use 3 to 6 million carats a year.

Concrete sawing and lensmaking are other possibilities.

The Future—GE is acquiring the technological knowhow needed to make larger stones—perhaps large enough to replace natural diamonds in oil well drill bits.

In connection with its research, the company is investigating pressures between 2.5 million and 6.25 million psi and temperatures over 5000° F. Says Mr. Kennedy: "This superpressure - temperature work has given us a new research tool . . . to test hardness, strength, ductility, and conductivity of many materials."

Pretesting New Products with Customers Will Answer These Questions...

1. What design changes are necessary for customer acceptance?
2. Can these changes be done with your production facilities?
3. Will the changes result in an objectionable price increase?
4. Where different test customers request different modifications, should additional models be added to the line to satisfy such demands?
5. Should installation be done by the factory or the customer? Will design changes be required in either decision?

Pretesting Ups Your Odds

You can do a lot of it in the lab, but the potential customer holds the key: He'll not only tell you what's good about your product but also what he thinks it lacks

AFTER WORLD WAR II, Minnesota Mining & Mfg. Co. developed a nonfading, maroon automobile paint. It was a good product, but sales never caught on, so 3M dropped it. Auto buyers were still distrustful of maroon because of prewar experiences.

Fortunately, most manufacturers of industrial products don't have to contend with the intangibles facing consumer goods makers in pretesting new products. But that doesn't mean that pretesting isn't important to them: It can determine the success or failure of your new product and whether you spend the minimum or maximum for tooling and tooling changes.

The Aims—Pretesting has these objectives: 1. Determining whether a new product meets its quality and performance requirements. 2. Trying to insure initial customer acceptance.

Basic information on the first objective is generally obtained in the laboratory. The second objective, according to many new product managers, is the most important and can best be done in the field with the help of potential customers.

Here's what you can learn:

1. Is Design Satisfactory?—Stewart-Warner Corp. is pretesting a centralized lubricating system which can be used in practically all types of machinery. Users who tried it have come up with ideas like this: Use a plastic oil reservoir so the oil level can be seen readily, eliminating the need to check a gage.

DoAll Co. checked with customers for suggestions on its new high speed cutoff saw and got this: Why not replace the steel blade guide inserts with carbide guides? Carbide guide inserts are now standard equipment on the saws. Comments L. R. Rothenberger, vice president: 75 per cent of the improvements on this saw have come from customer suggestions.

2. Are Price, Cost Right?—Pretests by customers will reveal these frequently overlooked costs: Installation and servicing. Who should install your product and service it? Will these costs added to the product's price make total cost too high?

Minneapolis-Honeywell Regulator Co. is developing a lighting system which controls room illumination according to the amount of daylight coming through windows. It's designed to save electricity in schools and other buildings. The major problem in costs is to keep installation expenses to a minimum. Solution: Honeywell is working with contractors and architects to get the system installed during construction rather than after, when costs would be higher.

3. What About Local Conditions?—Pretesting can reveal overlooked factors like variations in climatic conditions and customer shop or operating practices. In pretesting industrial tapes, 3M has learned they must withstand a wide range of temperatures. In some plants, temperatures never vary out of the 60 to 90 degree range; smaller shop owners often shut off heat from Friday afternoon until Monday morning to save fuel costs; temperatures may go below 32° F.

Advice—One precaution most executives recommend is to make sure you've made all necessary patent

filings to protect your development. Your test customer isn't going to take your development, but he has plant visitors who might be interested.

Another bit of advice: Try to maintain good control of pretesting to insure desired results.

Some companies rely on salesmen to provide the liaison between the test customer and new product engineers. Others prefer to have the engineers work directly with test customers. Test results are written up and analyzed by representatives from production, engineering, sales, and marketing to iron out compromises on five questions (see checklist on Page 70).

Expect Surprises — Pretesting will sometimes result in unusual situations such as DoAll experienced with its cutoff saw. The saw was originally designed to compete in the bandsaw classification. Officials knew the price would be slightly higher than that of existing saws but felt customers would gladly pay the premium for superior performance.

The assumption proved correct, but, as pretesting and customer feedback on initial sales continued, product modifications upgraded the saw into the power hacksaw category—both in price and performance. Officials recognized this and decided to design a new saw of the same type but with a lower price to compete with the bandsaw equipment which was the original goal. They did it by decreasing the saw capacity and stripping off some of the gingerbread. Recently, they added a third saw to the line—a larger one which competes with cold cutoff saws.

Test Period—How long should you pretest a product? It depends upon the new product and how much tooling will cost if later changes are required. Experience indicates that over half of all new industrial products will take two to five years to pretest.

There's no established formula. It's like making love, claims an eastern new product manager. Experience is your best guide, but each new situation demands an individual approach.

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Semiconductor Boom Kicks Sales Estimates Up*

	Revised Estimate	Estimated Last Fall
1961	$450 million	$400 million
1960	$350 million	$300 million
1958	$200 million	$150 million
1957	$125 million	$100 million

*Source: Joseph S. O'Flaherty, manager, Semiconductor Div., Hughes Aircraft Co.

Hughes Aircraft Co.

This assembly line moves fast as . . .

Semiconductor Sales Soar

IN CONTRAST to plateaus and slackening trends in many industries today, semiconductor makers have upped their estimated dollar volume for 1957 by 25 per cent (see table). Sales in 1956 hit $70 million.

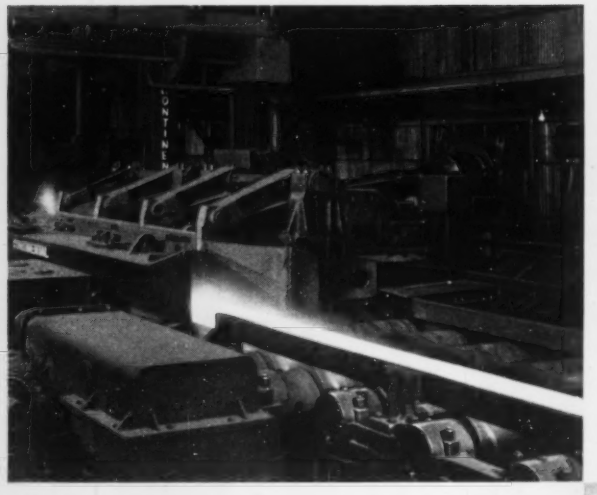
The youthful industry (it hardly existed five years ago) has only started to grow, claims Joseph S. O'Flaherty, manager of Hughes Aircraft Co.'s semiconductor division, Los Angeles.

Drop in Price—A germanium diode used in computers, which sold for $5 four years ago, now costs 70 cents. A silicon power rectifier which cost $7 about 18 months ago now sells for $3 and a silicon diode used in instrumentation, telemetering, and data processing has dropped from $6 to $1.25 in two years.

Jump in Production—While dollar volume for 1957 will be about 70 per cent above last year's, unit sales will more than double.

Hughes is increasing its manufacturing space from 135,000 to 205,000 sq ft. About 40 U. S. companies now make the product.

Things To Come—Mr. O'Flaherty said the semiconductor would make it possible to recharge automobile batteries overnight simply by plugging into an electric outlet, to stop the cycle-change noise in washing machines, and to upgrade the efficiency of home appliances and power tools.



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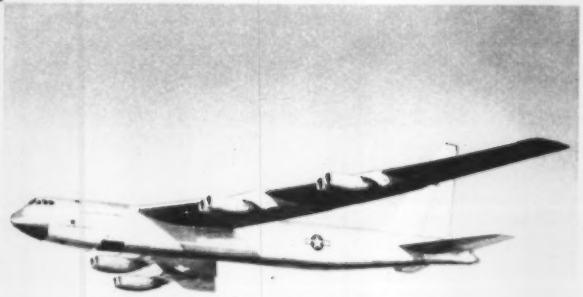
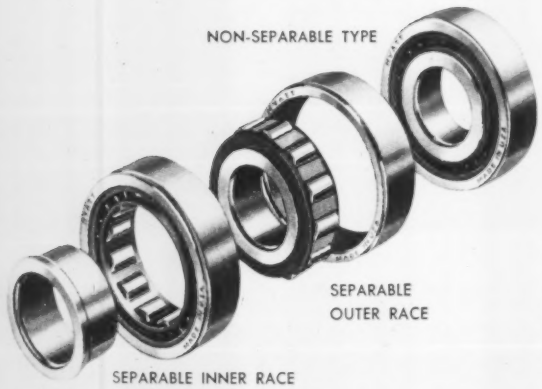
THE HIGHER THE SPEED...

the more you need HYATTS . . . because they're built with superior steels, scrupulous control of internal clearances and uncompromising inspections to assure smoother running, even at RPM's required in jet engines.



THE MORE YOU NEED *Cylindrical* HY-ROLL BEARINGS



More and more, as loads and speeds edge upward and housings must often be reduced in size, design engineers are turning to HYATTS to help squeeze improved life/load ratings into limited space. Quality-built HYATT Hy-Rolls not only solve the problem of increased radial loads, but the shouldered-race types will take a surprising amount of thrust as well. Ask your nearest HYATT Sales Engineer for recommendations—he can be a mighty big help to you! Hyatt Bearings Division, General Motors Corporation, Harrison, N. J.; Pittsburgh; Detroit; Chicago; and Oakland, California.

THE RECOGNIZED LEADER IN CYLINDRICAL BEARINGS

GM FORWARD FROM FIFTY

HYATT HY-ROLL BEARINGS

THE "WORKHORSES" OF MODERN INDUSTRY

Horsepower Race Ends?

Automakers play down increases in horsepower ratings (see table), but dealers still have a loophole: They have plenty to offer the speed merchants

THE HORSEPOWER RACE is over—or is it? Automakers seem to be playing down obvious increases in horsepower ratings.

Skeptics will be disappointed. The industry is abiding by the advertised horsepower ban established by its own Automobile Manufacturers Association.

Explanation—Rated horsepower is higher because 1958 engines were designed and tooled long before Detroit felt the full impact of politicians' cries for less speed and more safety.

Since the multimillion dollar programs couldn't be altered, the industry has canceled out the horsepower boost by changing axle ratios. The tactic resulted in some economy gains, with little sacrifice in performance. And economy is what many 1958 buyers want.

Buick—The Special series has not increased horsepower (250 at 4400 rpm), but it has lowered the axle ratio from 3.07:1 to 3.23:1 for cars with automatic transmissions. Theoretically, Buick should get slightly faster acceleration but poorer gas economy in starting ranges and lower top speed.

But Buick has made some changes in the pitch of its Dynaflow transmission which will give better gas economy in starting ranges without cutting down on quick pickup.

Oldsmobility—This GM division has boosted horsepower from 277 to 305, but the axle ratio with standard automatic transmission is unchanged (3.23:1).

Oldsmobile's Super 88 should accelerate faster, but gas economy in the starting ranges will be down. Top speed also should be up, as will cruising speed gas consumption.

Plymouth—The standard engine in Chrysler Corp.'s low-priced series has boosted horsepower and axle ratios (from 3.36:1 to 3.31:1).

On Belvedere models equipped with automatic shifts, acceleration could be slower (theoretically). Actually, increased horsepower and higher axle ratios tend to cancel out each other, so cars with this setup will perform about as well as 1957 jobs.

Ratings—Advertised horsepower is obtained by running a stripped-down engine on a dynamometer test stand and taking the average maximum reading from at least five trials. There are no generators, fans, or air conditioners to rob the engine of its full horsepower potential.

Net horsepower is figured with the engine installed in a car with all accessories operating.

Rear wheel horsepower is the horsepower delivered to the rear wheels. It's what is left after losses in the power train (transmission and differential) are deducted from net horsepower.

Dealer's Choice — Advertised horsepower is the figure dealers like to use since it's considerably higher than the others. Sometimes even this rating is played down.

Mercury's Park Lane and Lincoln share the same 430 cu in. engine with identical compression ratios. Lincoln reports the engine turns out 375 hp at 4800 rpm. Mercury claims 360 hp at 4600 rpm.

Here's How — Both statements are true, but Mercury has taken its readings on a lower range, so the Park Lane won't appear to be as powerful as the Lincoln.

Although the horsepower race has halted for now, dealers are in the position of having their cake and eating it, too. Once a prospect is in the salesroom, they can point to greater gas savings through easier working engines and, for the speed jockey, they can point to higher horsepower.

1958	HORSEPOWER	1957
310	Cadillac	300
375	Lincoln	300
345	Imperial	325
250	Buick Special	250
290	Chrysler Windsor	285
305	Oldsmobile Super 88	277
270	Pontiac Super Chief	244
265	Dodge Coronet Royal	245
305	De Soto Fireflite	295
360	Mercury Montclair	255
215	Rambler Rebel V-8	190
225	Studebaker President	210
250	Chevrolet BelAir	185
265	Ford Fairlane	212
225	Plymouth Belvedere	215

Based on standard engines and comparable revolutions per minute.

Packard To Use Plastic

Packard's 1958 models will be built with laminated plastic hoods and snouts.

Eugene J. Hardig, chief engineer,

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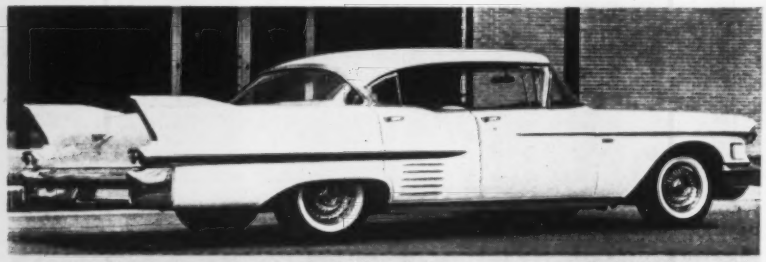


Cadillac's Sedan de Ville

ENGINE

Type: OHV V-8	**Carburetor: Four barrels**
Displacement: 365 cu in.	**Torque: 405/3100 rpm**
Compression ratio: 10.25:1	**Horsepower: 310/4800 rpm**

DIMENSIONS

Wheelbase: 129.5 in.	**Width: 80 in.**
Length: 225.3 in.	**Clearance: 6.4 in.**
Height: 59.1 in.	**Axle ratio: 3.07:1**

Studebaker-Packard Corp., says the switch was made because of lower tooling costs although piece price is higher than that of steel counterparts.

"The cost of plastic tooling for the two parts was only $65,325. Steel tooling costs would have been about $500,000," he explains.

Mr. Hardig says plastic is economical for other parts only if they're complex. Otherwise, it's cheaper to use steel.

Ford Reports Earnings

Ford Motor Co. reports nine-month dollar sales are $4.4 billion, compared with $3.2 billion in the same 1956 period.

Earnings were $229.5 million, up 58 per cent from the $145.2 million earned in the first three quarters last year.

Henry Ford II, president, says before-tax profits were almost 28 per cent below the $312.2 million earned in 1955. He explains this is because the company has spent more than $115 million on expansion and bringing out new product lines. Last year, similar capital expenditures totaled $60 million.

Mr. Ford adds the company has sold 1,742,208 cars and trucks in the first three quarters, compared with 1,380,063 vehicles for the like 1956 period.

Chrysler Supplier Stays

Electric Auto-Lite Co., Toledo, Ohio, will continue to supply starting motors, distributors, generators, and voltage regulators for Chrysler Corp. cars.

J. P. Falvey, Electric Auto-Lite president, says his firm has signed a three-year contract with the automaker. The company also says it's co-operating with Chrysler on long range development of other electrical components.

Initially, Chrysler indicated it was going to engineer and make the four items itself. The company has not made clear whether it will continue to buy other electrical parts from present venders.

Exhaust Notes

• Major truck builders are increasing prices about 5 per cent on heavy and medium-heavy lines. GMC Truck & Coach says its price boosts will average about 3 per cent although the average raise on pickup trucks is about 2.3 per cent.

• GM says it can cut down 90 per cent on oxides of nitrogen in automotive exhausts, but the special carburetor used for the job also cuts gas economy to about 11.8 mpg, compared with 15.9 on a control car with a standard carburetor.

• From Jan. 1 through Oct. 20, American Motors Corp. reports dealers sold 72,856 Ramblers, compared with 71,330 in calendar 1956. Sales in 1955 came to 73,807 units.

• Volkswagen has increased its port-of-entry prices on sun roof and sedan models by $50. This puts the port-of-entry Detroit price at $1718.59 for the VW sedan. Company spokesmen say 98 per cent of the VWs entering this country are equipped with whitewall tires which adds $25.75 to the port-of-entry price.

• James J. Nance, vice president and general manager of Ford's Lincoln-Mercury Div., says the marketing job done by industry next year could be the deciding force in determining the level of the national economy. "If there's enough change in the 1958 models, the auto industry could have a substantial part in making it a good year," he adds.

• Suppliers to the motor vehicle industry produce between $5 billion and $6 billion worth of automotive products annually, reports the Automobile Manufacturers Association.

U. S. Auto Output

Passenger Only	1957	1956
January	642,089	612,078
February	571,098	555,596
March	578,826	575,260
April	549,239	547,619
May	531,365	471,675
June	500,271	430,373
July	495,629	448,876
August	524,354	402,575
September	274,265	190,716
October	327,506	389,061
10 Mo. Total	4,994,642†	4,623,829
November		581,803
December		597,226
Total		5,802,808
Week Ended	**1957**	**1956**
Oct. 5	21,975	59,367
Oct. 12	38,626	70,175
Oct. 19	72,180	88,557
Oct. 26	104,987	104,269
Nov. 2	127,991†	117,583
Nov. 9	140,000*	132,087

Source: *Ward's Automotive Reports.* †Preliminary. *Estimated by STEEL.

ND FACTS

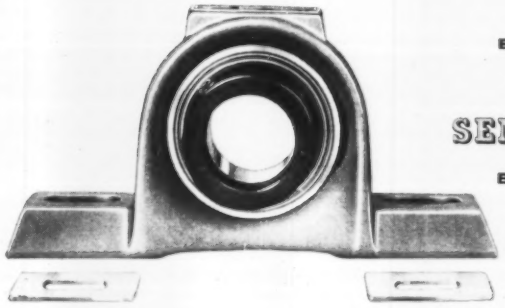
NEW DEPARTURE PILLOW BLOCKS— BUILT FOR LOWEST MAINTENANCE

- New Departure adapter ball bearings are sealed and lubricated for life.
- Design is compact and rigid—fits easily in limited space.
- No grease nipples or other protruding lubricating fixtures needed.
- Pillow blocks are easily mounted without need for any special tools.
- New Departure ball bearings are high capacity, precision-built for long life.
- Bearing and block surfaces are spherical to accommodate any misalignment.
- Thirty-two shaft sizes, $\frac{1}{2}$" through $2\frac{15}{16}$", for wide variety of applications.
- Interchangeable with most other makes of pillow blocks.

Bearings are easily applied to shafting and are positively locked in position with eccentric cam locking collar and set screw.

Elongated bolt holes designed to accommodate practically every type of spacing for hold-down bolts.

Mounting pads are furnished with each New Departure Pillow Block to assure easy interchangeability with all pillow blocks having a high base-to-center dimension.



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1908–1958 GM FORWARD FROM FIFTY

NEW DEPARTURE

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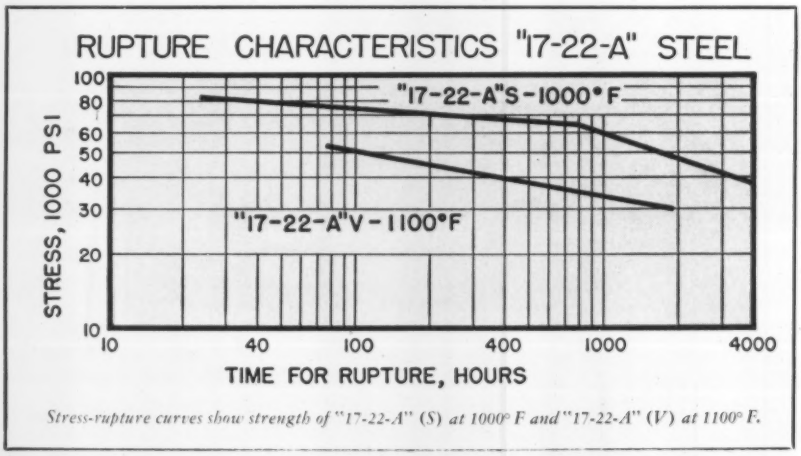
You get more advantages. "17-22-A" steels resist heat checking and thermal cracking. They are readily workable up to 2300° F. They are easily machined and welded. And maximum high temperature properties can be developed by normalizing and tempering, minimizing the possibility of distortion and quench cracking.

Send for complete information on "17-22-A" (S) steel, and its companion analysis, "17-22-A" (V), recommended for temperatures up to 1100° F. Ask for Technical Bulletin 36A. And call upon our technical staff for help with your high temperature steel problems. The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable: "TIMROSCO".



Stress-rupture curves show strength of "17-22-A" (S) at 1000° F and "17-22-A" (V) at 1100° F.

See the next Timken Televent hour, "The Innocent Years" over NBC-TV, Thursday night, November 21st.

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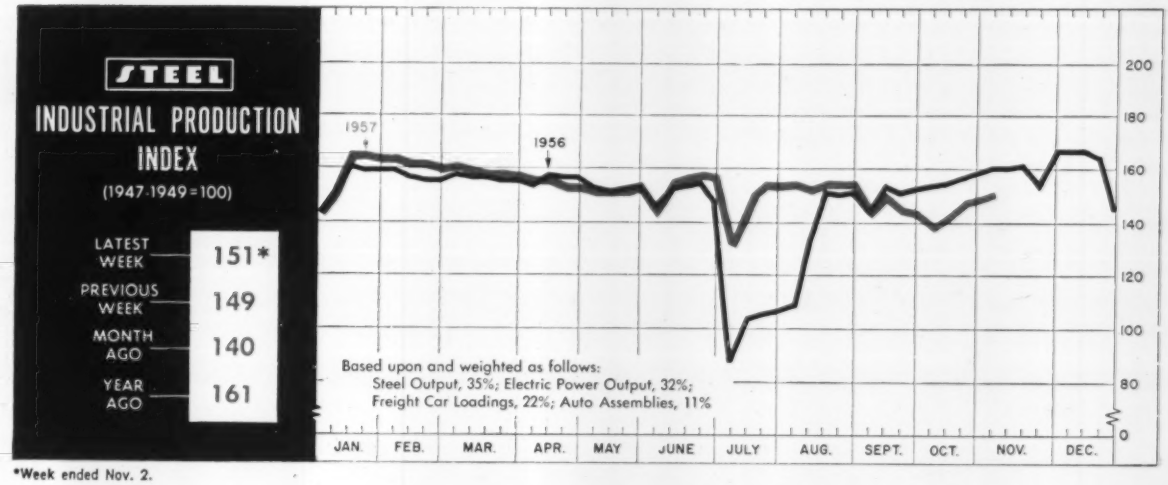

*Week ended Nov. 2.

Metalworking's Share of GNP May Dip

IN 1958, the nation's economy will move sidewise much as it has in 1957, but key barometers indicate metalworking's share of the gross national product will decline.

The prediction was made by Martin R. Gainsbrugh, chief economist of the National Industrial Conference Board, at the Convention of the National Tool & Die Manufacturers Association.

Prime Factors — The rate of growth in gross national product in 1957 is about equal to that of 1956. Department of Commerce statistics showed GNP in the third quarter of this year equal to an annual rate of $439 billion. The fourth quarter will be even better, said Mr. Gainsbrugh. Here are the major factors in his business outlook and their importance to metalworking's outlook:

1. Consumer spending remains high, and indicators point to a continuation at that level. The key to this barometer, however, is where the money is going. Manufacturing of hard goods is sagging, but nondurable goods, such as tobacco, food, and paper hit a record high in September. The consumer is reorienting his budget toward more of such goods.

Commenting on declines in manufacturing employment, the economist pointed out that total nonfarm employment in September was at a record high. The bulge was created by employment in activities such as insurance, finance, wholesaling and retailing, construction, state and local governments.

2. Private investment figures offer the darkest view for metalworking. During the first nine months of 1957, personal consumer expenditures increased 5.3 per cent over the comparable year-ago figure; government purchases increased 9.5 per cent; but gross private investment declined by 1.1 per cent, with all sections participating in the downtrend.

Cause for Concern—The most

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	2,015[1]	2,041	2,463
Electric Power Distributed (million kw-hr)	11,800[1]	11,787	11,487
Bituminous Coal Output (1000 tons)	9,885[1]	9,890	10,431
Petroleum Production (daily avg—1000 bbl)	6,750[1]	6,766	6,981
Construction Volume (*ENR*—millions)	$370.7	$359.6	$350.1
Auto, Truck Output, U. S., Canada (*Ward's*)	157,194[1]	132,625	144,097
TRADE			
Freight Car Loadings (1000 cars)	700[1]	704	800
Business Failures (Dun & Bradstreet)	281	258	267
Currency in Circulation (millions)[3]	$31,008	$31,129	$30,794
Dept. Store Sales (changes from year ago)[3]	−1%	0%	+2%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$21,635	$22,409	$21,534
Federal Gross Debt (billions)	$274.4	$274.4	$275.6
Bond Volume, NYSE (millions)	$22.9	$34.0	$18.6
Stocks Sales, NYSE (thousands of shares)	9,958	20,804	10,599
Loans and Investments (billions)[4]	$86.5	$87.3	$85.6
U. S. Govt. Obligations Held (billions)[4]	$25.3	$25.3	$25.9
PRICES			
STEEL's Finished Steel Price Index[5]	239.15	239.15	225.58
STEEL's Nonferrous Metal Price Index[6]	206.9	207.1	256.3
All Commodities[7]	117.5	117.7	114.9
Commodities Other Than Farm & Foods[7]	125.6	125.6	123.0

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1957, 2,559,490; 1956, 2,461,893. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100.

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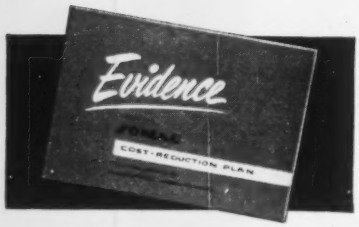

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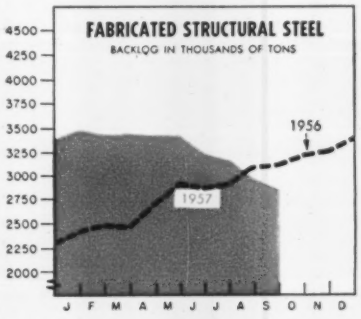
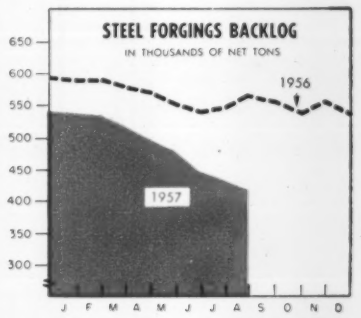
THE BUSINESS TREND



	Shipments 1957	Shipments 1956	Backlogs 1957	Backlogs 1956
Jan.	262.2	251.5	3,476	2,408
Feb.	278.5	285.4	3,436	2,476
Mar.	305.0	306.8	3,454	2,463
Apr.	313.6	289.6	3,416	2,687
May	329.6	306.2	3,417	2,896
June	329.3	284.7	3,220	2,859
July	303.5	165.5	3,138	2,904
Aug.	333.1	213.5	2,962	3,076
Sept.	294.7	240.9	2,846	3,108
Oct.	....	287.6	....	3,215
Nov.	....	276.0	....	3,252
Dec.	....	297.8	....	3,373
Total	....	3,205.5		

American Institute of Steel Construction. Charts copyright, 1957, STEEL.



	Shipments 1957	Shipments 1956	Unfilled Orders 1957	Unfilled Orders 1956
Jan.	148	160	537	589
Feb.	135	152	533	589
Mar.	146	159	517	578
Apr.	139	150	497	569
May	135	151	479	551
June	128	143	445	540
July	104	98	431	547
Aug.	115	123	417	562
Sept.	....	121	....	554
Oct.	....	148	....	539
Nov.	....	135	....	553
Dec.	....	130	....	538

U. S. Bureau of the Census. Data based on reports from commercial and captive forge shops with monthly shipments of 50 tons or more.

significant decrease was in investments for producers' durable equipment. During 1956, this segment showed an increase of 18.6 per cent over 1955. For three quarters of this year, it has declined steadily, standing only 5.2 per cent above the 1956 pace during the third quarter. Mr. Gainsbrugh feels the advantage will shrink to nothing in the current quarter and show minus signs next year. Reason: Capital expenditures, which have been a major prop to the economy, are now completed or are being scaled down. Production capacity from now until the 1960s will continue ahead of demand and reduce pressure for more expansion.

3. Federal expenditures are to be slashed, and if these cuts go through, they'll be reflected in lower metalworking sales. One possible offset to this decline is increasing spending by state and local governments. Pressures here will continue as school, highway, hospital, and other institutional programs are initiated to meet problems created by our population increase and the shift to the suburbs.

Three Big Ifs—The statistics do not take into account external stimuli which could change the over-all picture, Mr. Gainsbrugh emphasized. Any could change it. Activity on Capitol Hill indicates the growing likelihood of:

1. Tax relief in all forms, including depreciation, to boost purchasing power.

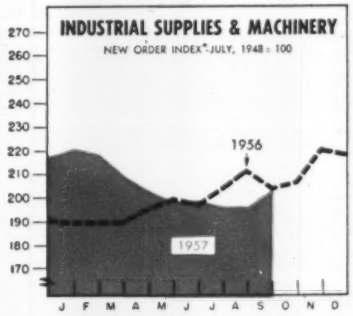
2. A stepup instead of a decrease in government outlays for defense.

3. An early shift toward easier money—the administration's biggest family squabble.

Plots Market Growth

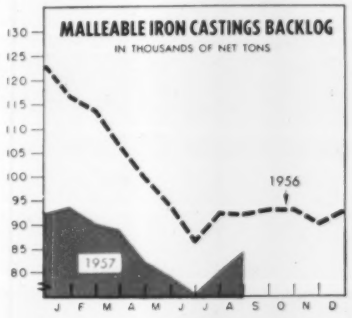
W. W. Morris, director of market planning, Westinghouse Electric Corp., Pittsburgh, probably would be in essential agreement with Mr. Gainsbrugh, if his comments before the Fourth Pitt Conference on Business Prospects are any indication. He feels that gross national product will advance from this year's predicted $435 billion to about $445 billion, but that the Federal Reserve Board's industrial production index will decline from the 145 average (1947-49 = 100) expected this year to 144 in 1958.

He sees continued growth for the major markets of the electrical



	1957	1956	1955
Jan.	221	190	160
Feb.	219	190	166
Mar.	210	190	171
Apr.	203	195	172
May	199	199	177
June	199	197	189
July	197	203	182
Aug.	197	211	186
Sept.	203	203	196
Oct.	...	206	195
Nov.	...	220	194
Dec.	...	218	191

*Seasonally adjusted.
Amer. Supply & Machinery Mfrs'. Assn.



	Shipments		Unfilled Orders*	
	1957	1956	1957	1956
Jan.	86.0	93.6	93.9	116.5
Feb.	78.0	93.6	90.7	113.6
Mar.	78.0	86.9	89.4	106.5
Apr.	80.3	83.3	83.1	99.6
May	76.5	78.8	79.8	93.7
June	72.6	75.6	76.3	86.2
July	57.7	54.3	80.7	92.1
Aug.	65.4	74.4	84.9	91.9
Sept.	...	69.4	...	92.6
Oct.	...	81.5	...	92.7
Nov.	...	82.7	...	90.0
Dec.	...	76.4	...	92.3
Total	...	950.5		

*For Sale. U. S. Bureau of the Census.

machinery and appliance industry, predicting:

Electric Utility Apparatus — Sales will increase from $2.15 billion this year to $2.36 billion in 1958. New orders will exceed this year's by 8 to 10 per cent.

Industrial Goods—Sales of electrical goods to industry next year will approximate this year's $2.6 billion.

Construction—Sales will drop 3 to 5 per cent under this year's $5 billion mark even though this activity will continue at present high levels. The product mix in building next year will work against any increase here.

Appliances — Sales will regain the 1956 level, which will mean an increase of about 4 per cent over the 1957 level.

Defense — Continued growth is the prospect as missiles come into their own. Next year should witness a volume of over $5 billion.

The plusses will outweigh the minuses in 1958, Mr. Morris thinks, resulting in an increase of 2 to 3 per cent in total sales.

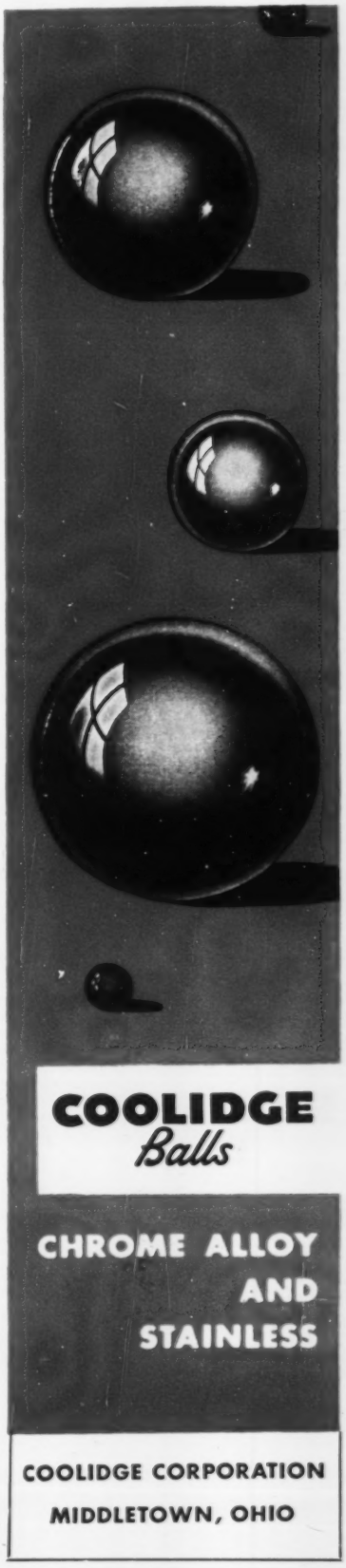
Construction: Prop in '58?

As in the last few years, economists are expecting the construction industry to be one of the main props under the economy in 1958. Two authorities have come up with predictions which are worthy of note if for no other reason than their similarity.

Thomas S. Holden, vice chairman of F. W. Dodge Corp., New York, predicts an increase of 5 per cent in construction contracts for 1958. Theodore J. Taylor, manager, Financial Analysis Dept., Pittsburgh Plate Glass Co., Pittsburgh, thinks total expenditures for construction will hit $49 billion, 5 per cent above this year's expected $47 billion.

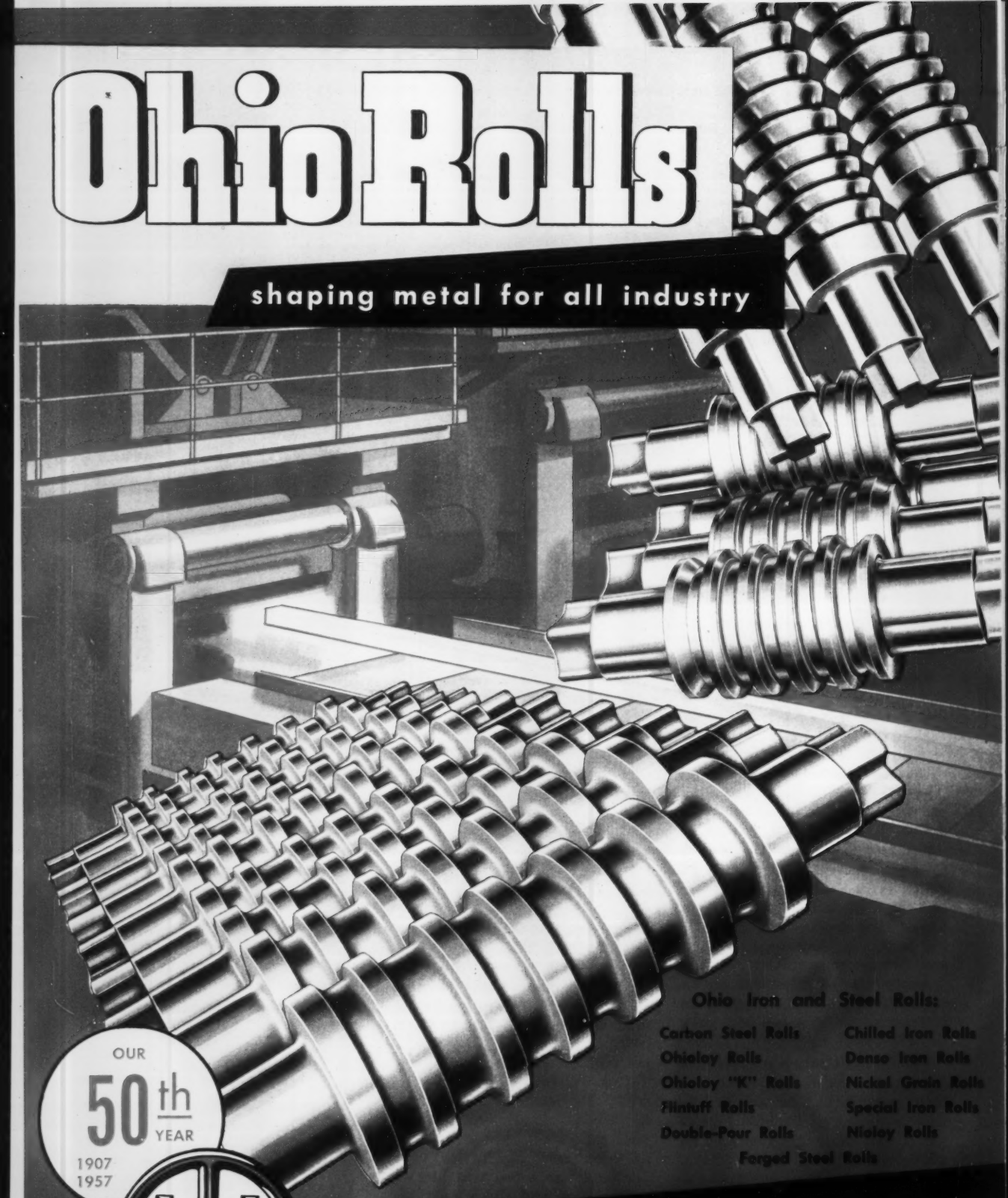
Here's how their expectations compare in some important areas: Housing starts: Mr. Holden, 1,075,000 units; Mr. Taylor, 1,050,000. Commercial: Mr. Holden, 4 per cent decline in floor area; Mr. Taylor, "slightly slower." Industrial: Mr. Holden, off 6 per cent; Mr. Taylor, off as much as 8 to 10 per cent. Utilities: Mr. Holden, up 7 per cent; Mr. Taylor, up 15 per cent. Both feel that highway construction and educational, hospital, and religious building will peak in 1958.

Construction contract awards through September were 2 per cent ahead of a year ago, Dodge says.



Ohio Rolls

shaping metal for all industry



Ohio Iron and Steel Rolls:

Carbon Steel Rolls	Chilled Iron Rolls
Ohioloy Rolls	Denso Iron Rolls
Ohioloy "K" Rolls	Nickel Grain Rolls
Flintuff Rolls	Special Iron Rolls
Double-Pour Rolls	Nioloy Rolls
Forged Steel Rolls	

OUR 50th YEAR
1907
1957

THE OHIO STEEL FOUNDRY CO.

LIMA, OHIO

Plants at Lima and Springfield, Ohio

OR14

LAFAYETTE E. HAMMOND
president of Lehigh Inc.

JAMES W. STOTTLEMYER
Eastern Stainless sales mgr.

W. L. WEARLY
Joy Mfg. president

ALBERT C. WEDGE
DeWalt v. p.-mfg.

Lafayette E. Hammond was elected president, **Lehigh Inc.**, Easton, Pa. Former chief engineer, he succeeds **Alvin A. Shumann**, named chairman of the finance committee. **Leroy M. Bissett** and **Clayton L. Coulter** were elected vice presidents. Mr. Bissett continues as general manager of Lehigh Mfg. Co., refrigeration products division. Mr. Coulter is now in charge of purchasing.

Eastern Stainless Steel Corp., Baltimore, named **James W. Stottlemyer** sales manager. **Martin J. Bartholomey** was made assistant to the sales manager; **David E. Russell**, manager of customer service.

John E. Rowe fills the new post of executive vice president, **Tomkins-Johnson**, Jackson, Mich. He was vice president of Ross Operating Valve Co. **William J. Remund** was promoted from sales manager to the new post of vice president-sales. **Adam P. Jankowski** was made sales manager; **Robert L. Curtis**, assistant sales manager.

Mark A. Norcott was made manager of aluminum sales for **Korhumel Steel & Aluminum Co.**, Evanston, Ill. He has been with the company four years in a sales capacity.

Raymond Schiff joined **Yellow Springs Instrument Co.**, Yellow Springs, Ohio, as sales manager. He was product line sales supervisor for electrochemical instruments, Beckman Instrument Co.

W. L. Wearly was elected president, **Joy Mfg. Co.**, Pittsburgh, to succeed **John Lawrence**, resigned. **A. B. Drastrup** succeeds Mr. Wearly as executive vice president.

Kendrick R. Wilson Jr. was elected president of **Avco Mfg. Corp.**, New York, to succeed **Raymond A. Rich**, who resigned to serve the company as a consultant. Mr. Wilson was vice president.

Denzil Hawkins and **Theodore Rancont** were named vice presidents of **Producto Corp.** They continue as branch managers in their respective cities—Mr. Hawkins at Dayton, Ohio; Mr. Rancont at Detroit.

Carl J. Bliemeister was named purchasing agent for **A. O. Smith Corp.'s** Granite City, Ill., auto frame plant. He was a member of the company's central purchasing department in Milwaukee.

Norman L. Peukert was made director of sales engineering and development, **Carondelet Foundry Co.**, St. Louis. He was general superintendent.

Leon Weiss joined **Preco Inc.**, Los Angeles, as product sales director. He was sales manager, power products division, C & C Super Corp., New York.

John P. Moffatt Jr. was made director of quality control, central manufacturing division, **Consolidated Electrodynamics Corp.**, Pasadena, Calif. He succeeds **A. P. Stuhrman**, now division manager.

Albert C. Wedge was elected vice president-manufacturing, **DeWalt Inc.**, Lancaster, Pa., subsidiary of American Machine & Foundry Co. He was production superintendent.

Jerome S. Stanford joined Olin Mathieson Chemical Corp. as executive assistant to the vice president-sales of **Olin Aluminum**, New York. He was vice president of Varcum Chemical Corp., Niagara Falls, N. Y.

Gordon Austin, sales representative in Philadelphia for Republic Steel Corp.'s **Berger Div.**, was transferred to sales headquarters in Canton, Ohio, to head promotion and sales of new material handling products developed in Berger's shelving department.

D. N. Frey, formerly director of engineering research, **Ford Motor Co.**, Dearborn, Mich., was made executive engineer, Ford Div. car product engineering.

Carl N. Furay was appointed southeastern head of **Howard Foundry Co.'s** design engineering field service. He was a chief engineer of a design group for Pratt & Whitney Aircraft, division of United Aircraft Corp.

York Corp., York, Pa., subsidiary of Borg-Warner Corp., named **Robert G. Werden** general sales manager of engineered equipment; **Robert E. Cassatt**, general sales manager, packaged products; **M. S. Lebair**, assistant vice president-marketing; **Walter L. Pharo**, gen-

DAVID G. COLLINS *SpeedWay Mfg. v. p.*

DOUGLAS M. PARK *Associated Spring div. p. a.*

KENNETH W. BRULAND *Alan Wood plant supt.*

eral sales manager, contract products.

David G. Collins was named vice president, **SpeedWay Mfg. Co.**, Cicero, Ill., subsidiary of Thor Power Tool Co. He is in charge of the electric motor division. Mr. Collins was sales manager of the SpeedTool division.

Douglas M. Park was named purchasing agent of **Associated Spring Corp.'s** B-G-R Div., Plymouth, Mich. He replaces **Norman R. Gardner**, assigned to cost accounting work in the divisional comptroller's office. Mr. Park was factory manager, Wallace Barnes Co. Ltd., Hamilton, Ont., Canadian subsidiary.

Richard B. Loynd was named merchandise sales manager, **Emerson Electric Mfg. Co.**, St. Louis.

Harry Cramer was named assistant sales manager, **John S. Barnes Corp.**, Rockford, Ill. He will direct sales of company products made for automotive and other mass production industries.

Ralph Fifield was made manager of the Los Angeles branch of **Binks Mfg. Co.**, Chicago.

Warren Gressle was made a sales engineer for aircraft products division, **Cooper Alloy Corp.**, in Clark Township, N. J.

Frank N. Nolan was made superintendent of maintenance, Buffalo steel plant, **Republic Steel Corp.**

P. J. Baltes was made Ohio district sales manager, **Duff-Norton Co.** He is at Cleveland.

Kenneth W. Bruland was named superintendent of **Alan Wood Steel Co.'s** new iron powder plant, to be constructed at Ivy Rock, Pa. For the last six years, he has been engaged in company research on development of iron powder production methods and processes.

Boyce M. Hill was made sales manager, hydraulic division, **Parker Aircraft Co.**, Los Angeles, subsidiary of Parker-Hannifin Corp.

M. E. Loose, assistant purchasing agent, was made manager of the purchasing division of **Ohio Oil Co.**, Findlay, Ohio. He succeeds **Earl W. Shoupe**, retired. **E. T. Snyder**, also assistant purchasing agent, was made purchasing agent. The changes will be effective Dec. 1.

Lewis G. Woods was made director of supply and inventory, **International Harvester Co.**, Chicago, to succeed **Mercer Lee**, vice president, who retired.

W. H. Stewart was appointed Seattle district manager, ElectroData Div., **Burroughs Corp.** He succeeds **Meade C. Camp**, now Philadelphia district manager.

C. E. Flora was made manager of industrial sales, **Davey Compressor Co.**, Kent, Ohio. He was compressor division manager, Binks Mfg. Co.

P. Howard Farley was made manager, distributor and contractor sales, **Anaconda Wire & Cable Co.**, New York, subsidiary of Anaconda Co. Mr. Farley joined Anaconda Wire & Cable last year as manager-contractor sales. For three years previously, he was sales promotion manager and also director of marketing for the National Electrical Contractors Association.

George T. Hubbell was elected president and **T. Mark Keefe** executive vice president and treasurer of **Seymour Mfg. Co.**, Seymour, Conn. Mr. Hubbell presently is serving as president of American Refractories & Crucible Co. Mr. Keefe was an executive of Mullite Refractories Co.

C. T. Stott was named to succeed **C. E. Clarke**, retired, as general manager of the Sparrows Point, Md., plant of **Bethlehem Steel Co.**

J. Barrie Graham was made director of research for **Buffalo Forge Co.**, Buffalo.

Charles R. Claxton was named assistant chief engineer, nuclear projects division, **Stone & Webster Engineering Corp.**, Boston.

L. E. Jolls was made manager, quality control department, tractor and implement division, **Ford Motor Co.**, Birmingham, Mich. He succeeds **W. R. Phillips**, now production manager of the Des Moines, Iowa, implement plant.

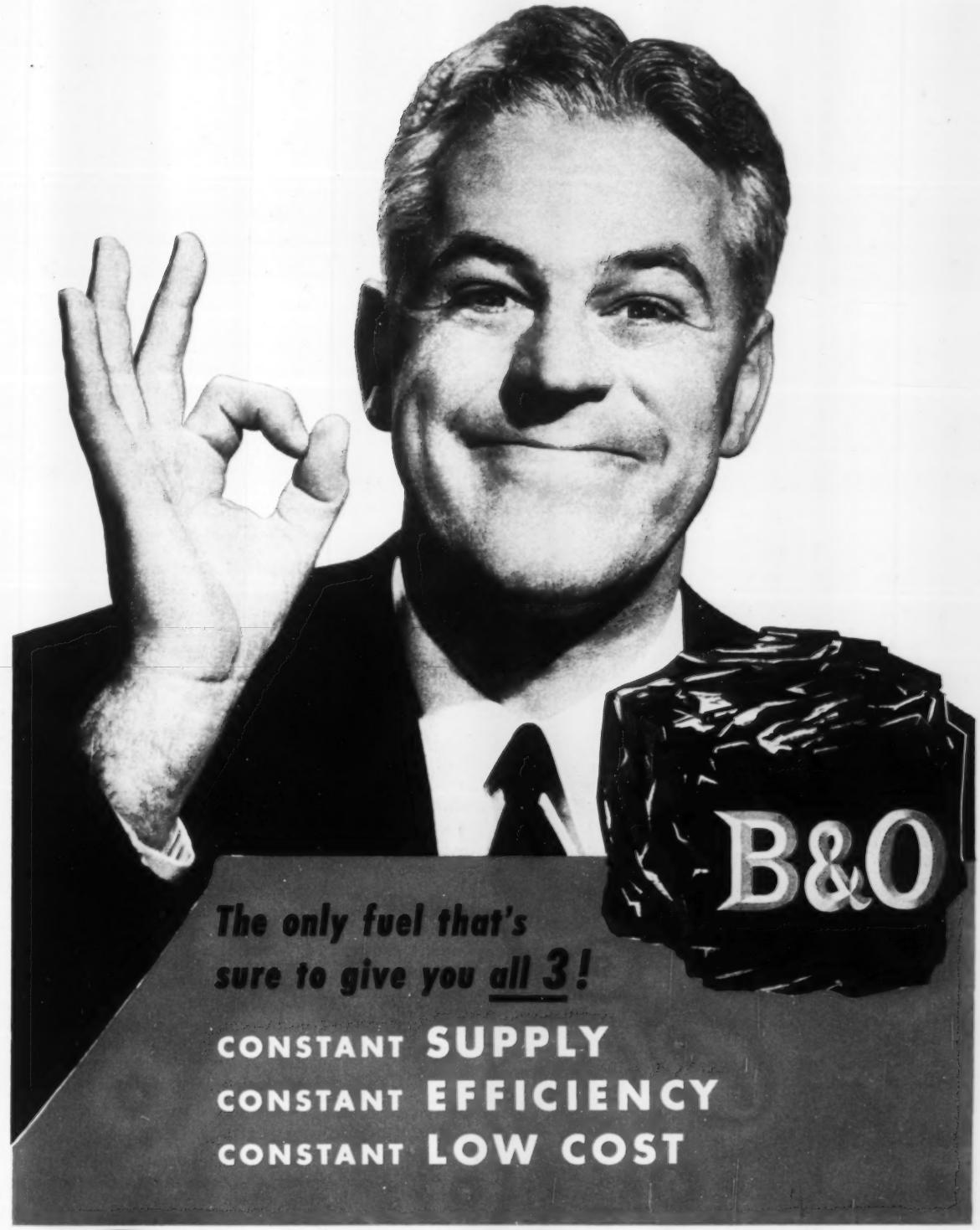
Gerald A. Stone succeeds **Edward G. Wendell**, retired, as district manager of the Dallas office and factory branch store of **Link-Belt Co. William R. Palmer** replaces Mr. Stone as district manager of the Shreveport, La., office.

Arthur A. Cline was made technical control manager, electrode division, **Great Lakes Carbon Corp.**, at Niagara Falls, N. Y.

Square D Co. named **Daniel H. Miller** manager of the western division, with headquarters at Los Angeles.

A. Gregg Noble was made assistant to the director of operations, **Solvay Process Div.**, Allied Chemical & Dye Corp., Syracuse, N. Y.

James M. Stuart was named a vice president of **Reynolds Aluminum Sales Co.** and made general manager of the eastern sales region of the parent **Reynolds Metals Co.** He is at New York. **Harry J. Williams**, formerly general sales manager-eastern region, was made



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CHARLES A. WOODLEY
Caterpillar Tractor executive

A. F. SKIPP JR.
Herr Equipment sales mgr.

THEODORE B. RUSSELL
Mount Vernon Bridge v. p.

JAMES P. McNALLY
heads new Arcflux plant

JOSEPH O'REILLY
Ferroxcube Corp. gen. mgr.

W. F. KRUSPE
heads Valvair Corp.

executive sales representative in New York.

James P. McNally was named product manager of the new Philadelphia plant of **Arcflux Corp.**, subsidiary of Arcos Corp. He was superintendent with Union Tank Car Co. Previously he had been sales manager, Bart Mfg. Corp., and production metallurgist, Carrier Corp.

Joseph O'Reilly was made general manager, **Ferroxcube Corp. of America**, Saugerties, N. Y., a subsidiary of North American Philips Co. Inc.

Sales representatives appointed by the steel division of **Copperweld Steel Co.** included **Kenneth L. Kinser**, made Indianapolis district sales manager, and **Ralph E. Barcus**, Milwaukee sales manager. **James D. McKinnon** and **Preston C. Patch** were named to the Chicago sales office.

Ralph J. Bannon was elected president and chairman, **Bannon & Co.**, San Diego, Calif.

Valvair Corp., Akron, Sinclair-Collins Valve Co., elected **W. F. Kruspe** president and general manager to succeed **J. E. Collins**, now chairman. Mr. Kruspe was executive vice president.

Clifford A. Buehrens was made assistant manager of the Lorain, Ohio, yards of **American Ship Building Co.** He was with Christy Corp.

Dr. Clarence A. Stiegman was named technical director; **Dr. J. Howard Brown**, general manager, research and development, at **Hooker Electrochemical Co.**, Niagara Falls, N. Y. **Dr. Johannes H. Bruun**, director of research and development, has resigned.

Duane S. Seavey, general sales manager, was appointed executive vice president of **Ralston Steel Corp.**, Skokie, Ill.

John E. Flickinger was named sales manager, electronics division, **General Controls Co.**, Los Angeles.

Charles A. Woodley was elected an executive vice president, **Caterpillar Tractor Co.**, Peoria, Ill. He continues direction of the manufacturing division. He was a vice president.

A. F. Skipp Jr. was made sales manager, **Herr Equipment Corp.**, Warren, Ohio. He joined the firm in 1956 as sales engineer. He formerly was with Westinghouse Electric Corp.

Theodore B. Russell, former manager of bridge sales, Pittsburgh-Des Moines Steel Co., was elected vice president of **Mount Vernon Bridge Co.**, Mt. Vernon, Ohio.

George E. Kuck was made manager, metallurgical instruments division, **Intercontinental Electronics Corp.**, Mineola, N. Y. He was manager of the materials laboratory of Avco Mfg. Co.'s Lycoming Div.

Russell F. Derr was made assistant general sales manager, **Jones & Laughlin Steel Corp.** He has been Detroit district sales manager for Pittsburgh Steel Co. In his new post with J&L, his offices are in Detroit.

Louis R. Garza was made manager of the international division of **F. J. Stokes Corp.**, Philadelphia. He was export manager, Henry Disston Div., H. K. Porter Company Inc.

OBITUARIES...

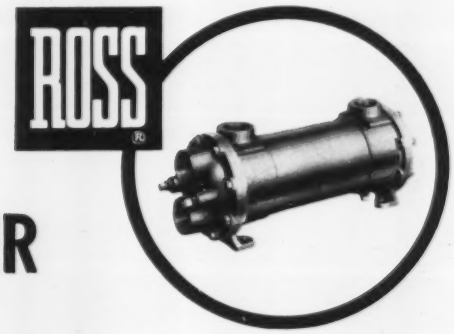
Forrest C. Clough, 73, president, **Federal Gear Inc.**, Cleveland, died Oct. 30.

Leroy Salsich, 78, former president of U. S. Steel Corp.'s **Oliver Mining Div.**, died Oct. 26 in Duluth.

Joseph J. White Jr., metallurgical and research associate at **Erie Forge & Steel Corp.**, Erie, Pa., died Oct. 20.

John R. Voigt, 45, Milwaukee district manager, **Moody Engineering Co.**, died Oct. 20.

Oscar H. Schildknecht, retired sales manager, **Maynard Electric Steel Casting Co.**, Milwaukee, died Oct. 26.



ROSS EXCHANGER

conditions this Loewy Forging Press to deliver its full, 2000-ton wallop!

Courtesy Loewy-Hydropress Inc., New York

Forging blooms in specialty alloy steels, this Loewy Hydropress slams down its 2000-ton fist with consistent force at high speeds.

To maintain peak capacity of the hydraulic power system, a Ross Type BCF Exchanger was installed as original equipment. Its efficient performance dissipates hydraulic heat, assuring full-rated power at all times. This press is conditioned for the job.

Throughout the industry, Ross Exchangers are favored by numerous manufacturers building hydraulic machinery of every description. There are many solid reasons for this preference, including: (1) *Ruggedness*—The ability to take the punishing shock of sudden hydraulic surges. (2) *Thermal Efficiency*—Unsurpassed by any other heat exchanger design. (3) *Standardization*—Pre-engineered and mass produced parts permit economic manufacture in a wide range of sizes to answer most needs. (4) *Engineering Cooperation*—Ross representatives have a reputation for helpful consultation and practical recommendations.

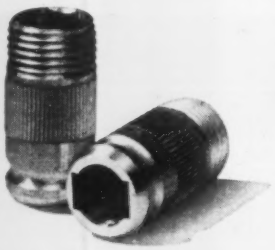
For detailed information on how Ross Exchangers can help you meet your heat transfer requirements, request Bulletin 1.1K5. Ross Heat Exchanger Division of American-Standard, Buffalo 5, N.Y. In Canada: American-Standard Products (Canada) Limited, Toronto 5, Ont.

ROSS HEAT EXCHANGER

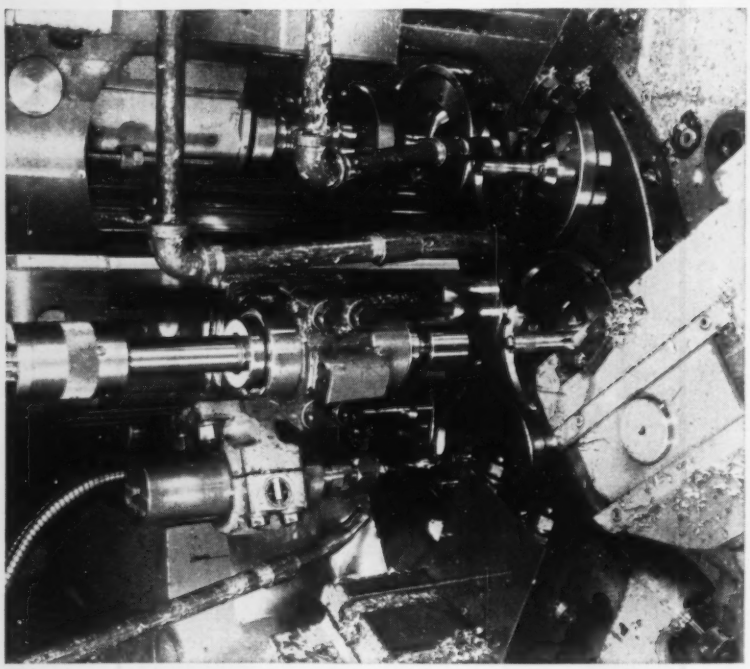
Division of AMERICAN-Standard

At Porter-Cable Machine Company.....

6-Spindle Automatic saves $12,700 on this one job!



A savings of over 7½¢ was realized on each of these small brass Brush Holder Bodies for electric motors when this formerly subcontracted work was handled on one of their 1¼" Warner & Swaseys.



Porter-Cable of Syracuse, N. Y., veteran producer of wood-working tools and powered garden equipment, reports through their Chief Manufacturing Engineer, Charles Allen: *"Our two Warner & Swasey 6-Spindle quick setup Automatics have an important place in our cost-reduction program. They consistently turn out the highly accurate parts our products require, saving us money on jobs that run in lot sizes from a few hundred to many thousand pieces."*

Here's what Warner & Swasey 6-Spindle Automatics did for Porter-Cable Company:

- **ACCURACY**—Tolerances of plus or minus .001" easily held, maintaining high product quality.
- **SAVINGS**—Second operations were eliminated—handled complex work formerly subcontracted.
- **FAST SETUP—SMALL LOTS**—Jobs previously run on hand screw machines now more efficiently handled on the Automatics.
- **VERSATILITY**—Machining of tougher materials, parts with threads at each end, multiple diameters, broached holes are all now routine operations.

Why not have our Field Engineers evaluate your operations with a view to highlighting jobs that could be more profitably machined on modern Warner & Swasey Multi-Spindle Automatics? He's as near as your phone—call him today!

WARNER & SWASEY
Cleveland
PRECISION MACHINERY SINCE 1880

YOU CAN PRODUCE IT BETTER, FASTER, FOR LESS...WITH A WARNER & SWASEY

Tubes by the Mile

New mill installed at Chase's Cleveland plant draws copper tubing up to 9000 ft long

AN AUTOMATED copper tube mill is operating at the Cleveland plant of Chase Brass & Copper Co., a subsidiary of Kennecott Copper Corp.

Completion of this multimillion dollar expansion program, begun in 1955, provides uninterrupted production of copper tubing from billet to finished tube, on electronically controlled, high speed machines.

Apparatus—Equipment includes a 400-ft drawbench capable of simultaneously drawing five 43-ft tubes to straight lengths up to 210 ft. Another feature is a magnetic defect detector that performs critical internal and external inspections. Continuous production of nonwelded lengths of copper tubing up to 9000 ft long has been attained in the plant.

The new mill is housed in a 234,000 sq-ft addition to Chase's Babbitt Road plant, which also produces brass and copper rods and bars in adjoining sections. Sheets and strip of brass and copper are made in Chase's nearby Euclid plant.

Opens Engineering Center

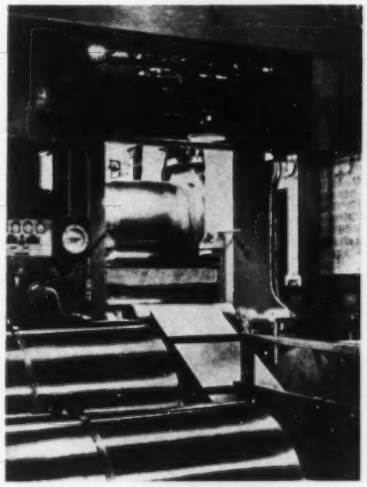
A new center for the Engineering & Construction Dept., Electro Metallurgical Co., a division of Union Carbide Corp., has been formally opened at Niagara Falls, N. Y.

The six-floor building has 49,000 sq ft of floor area. It features air conditioning, fluorescent lighting, self-service elevators, stainless steel trim, and vinyl floor tile. Employment is 170.

Reynolds Forms New Firm

Reynolds Metals Co., Richmond, Va., formed a wholly owned Australian subsidiary, Reynolds Pacific Mines Ltd., with headquarters in Melbourne. Richard S. Reynolds Jr., Reynolds' president, is chairman of the subsidiary. Walter L. Rice is its president.

The company was formed to acquire bauxite deposits and other raw materials in quantities large enough "to ultimately justify establishment of an integrated aluminum industry in Australia."



Gadsden's New Strip Mill
This 54-in. temper mill is part of a strip mill installed by Republic Steel at Gadsden, Ala. Other equipment includes a 54 in., hot strip mill; a 54 in., 3 stand, tandem cold mill; a continuous pickle line; a 48 in., continuous galvanizing line; 48 in. cold cutting and hot cutting lines; a multiple slitter; and annealing facilities

Introduces New Alloy

Kawecki Chemical Co., Boyertown, Pa., is introducing a 2.75-3.25 per cent boron-aluminum alloy, complementing its present 1.50-2.25 per cent alloy. In addition, the company announced 5.0-6.0 per cent boron-aluminum, 5 and 10 per cent tantalum-aluminum, and 5 and 10 per cent columbium-aluminum are available in limited quantities for research and development programs.

Builds Research Center

Hooker Electrochemical Co., Niagara Falls, N. Y., is building a research center on Grand Island, N. Y. To be completed in about 15 months at a cost of $3.5 million, it will provide space for about 200 employees.

The 69,000 sq-ft building will be situated on a 61-acre tract. It will have research labs, administration and stenographic sections, a libra-

(*Please turn to Page* 90)

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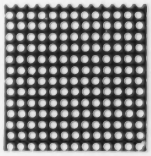
Perforated Steel Sheets from Stock
from H&K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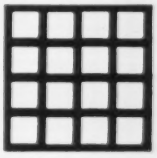

Patterns are available for both industrial and decorative uses

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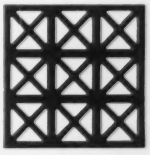

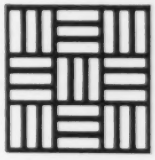
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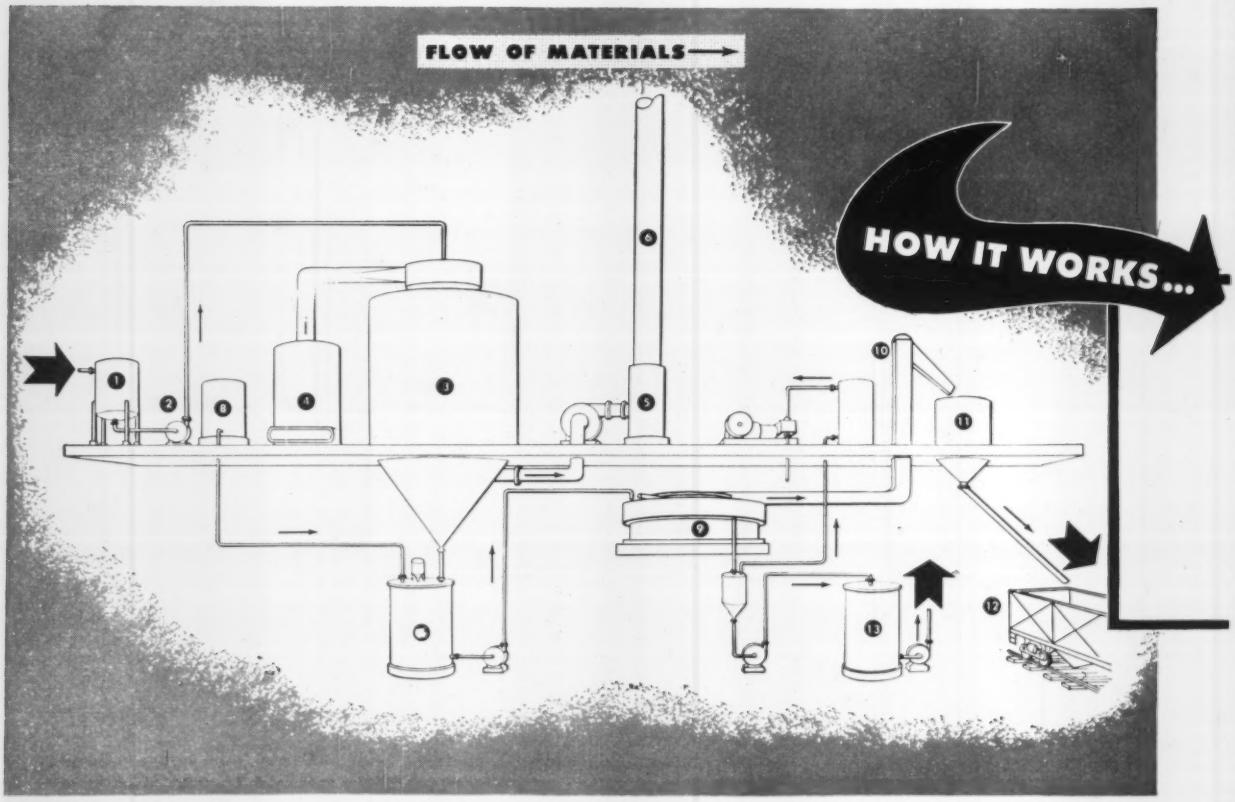
If you operate a

CUT ACID REQUIREMENTS

New continuous process, available from Koppers, of pickling acid used . . . and eliminates waste

FOR OVER A QUARTER OF A CENTURY, wherever a pickling line has been in operation, disposal of spent liquor has been a major headache. But now a new continuous regeneration process—the Koppers Inland-Zahn process— goes a long way toward solving this problem. This system is simple, it is economical, and *it has been proved in actual plant-scale commercial operation in Europe.*

With this process, the only make-up acid needed is the amount consumed in the pickling reaction plus normal losses. *All* available free acid in the used liquor is recovered (up to 50% of the original charge). Labor costs are low—just one man can operate the entire regeneration plant. As a result of these savings, operating costs are substantially below those of any presently available disposal method.



pickling line

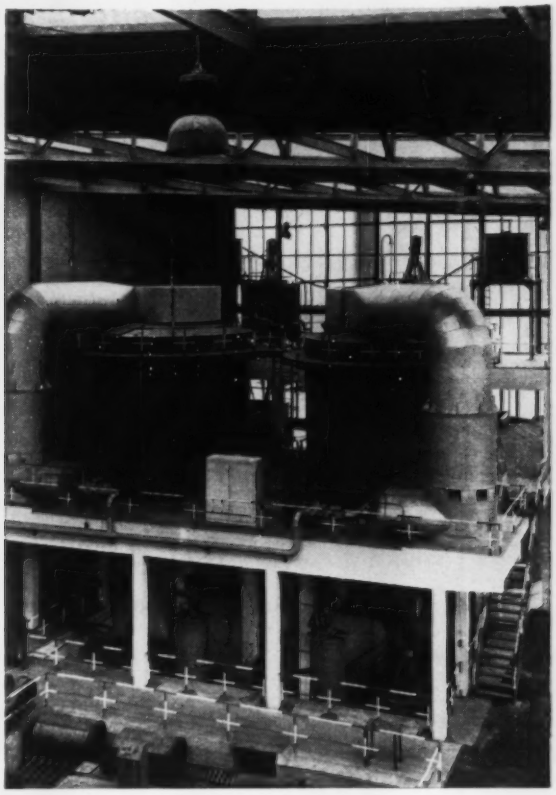
IN HALF!

regenerates up to half liquor disposal problem

PROVED COMMERCIALLY—This process, developed by Inland Steel Company and adapted commercially by Zahn & Co. of West Germany, is now being used successfully in three European steel plants. The benefits achieved include *extremely low maintenance* . . . and more uniform and *higher* acid concentrations in the baths. The latter advantage permits faster steel processing.

NEUTRALIZING PLANTS – The new regeneration process is especially applicable to plants handling 10,000 gallons of effluent, or more, a day. The Chemical Department of Koppers Engineering and Construction Division also designs and builds lime neutralization systems for both large and small pickling operations. Send the coupon for complete information about these and other Koppers Chemical Engineering Services.

Spent pickle liquor (1) is pumped (2) to spray head in an evaporating chamber (3). Here, hot air and flue gases from a combustion chamber (4) concentrate the liquor and cause the ferrous sulfate monohydrate to crystallize out of solution. Vapor laden air is discharged to atmosphere through a mist eliminator and stack (5 and 6). The slurry is dropped into a crystallizing tank (7) where fresh sulfuric acid is added from a metering tank (8). This causes more monohydrate to drop out. The slurry is then separated in a vacuum filter (9) and washed. Salt is conveyed to bins or hopper cars for sale or disposal (10, 11, 12). Mother liquor, containing about 35% acid and 1-2% iron, is pumped to a holding tank (13), ready for dilution and return to the pickling tanks. No reheating is required.



HEART OF THE SYSTEM—This spray dryer concentrates spent liquor to slurry of ferrous sulfate monohydrate crystals suspended in acid. The plant shown here, in Germany, has operated since June, 1954, processing 48,000 gallons per day of waste liquor.

GET ALL THE FACTS!

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Engineering and Construction Division
1454 Koppers Building
Pittsburgh 19, Pennsylvania

I would like to receive literature on this new pickle liquor regeneration process . . . and also on Koppers other chemical engineering services. Please send the following:

- ☐ **Regeneration of steel pickling solutions by Koppers Inland-Zahn process.**
- ☐ **Lime neutralization of spent pickle liquor by Koppers.**
- ☐ **"3 Keys to Selecting Your Industrial Contractor," a brochure describing the variety of Koppers construction services and giving reasons why Koppers should build your next chemical plant.**

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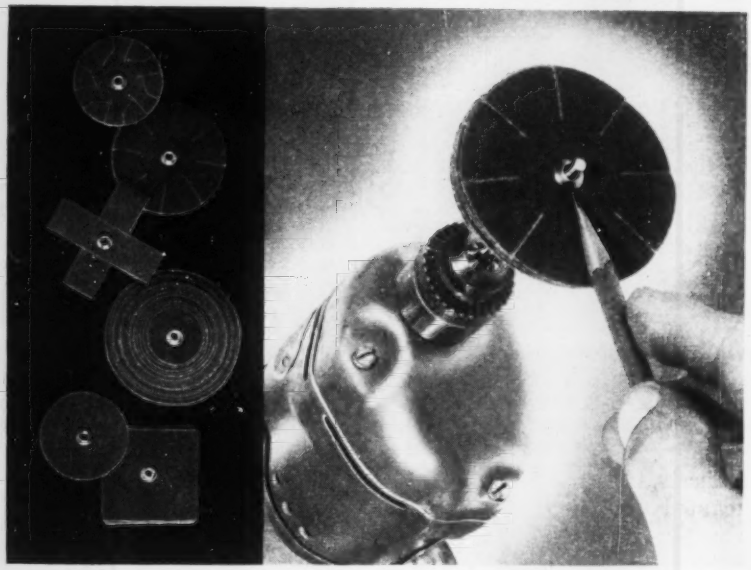


Tubular's PERMA-NUTS AND RIVETERS HELP DAYTON ABRASIVE PRODUCTS, Inc.*

PERMA-NUTS Do Double Duty

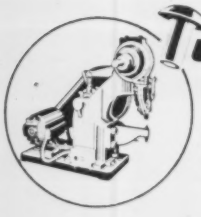
Dayton uses ***Tubular's*** PERMA-NUTS to permanently fasten its abrasive assemblies and at the same time provide a threaded fitting. This allows the assembly to be quickly spun on or off of a power-tool mandrel and gives the product a special sales advantage. Dayton saves assembly time by using ***Tubular's*** Riveting Machines. They are made to automatically feed and set PERMA-NUTS.

* DAYTON ABRASIVE of Dayton

Dayton Abrasive Products, Inc., in twelve years has become one of the country's leading manufacturers of abrasive specialties. "Ingenuity," as evidenced by the adaptation of PERMA-NUTS to Dayton's "Spinner Settings®," may be considered a primary ingredient of the company's success.

TUBULAR of Quincy

When fast, automatic, economical, permanent fastening of your assemblies is the problem, turn to ***Tubular***. We have the rivets, the machines and the experience. For further information and technical help call our nearest office or send us your blueprint or sample assembly. A special Design Bulletin on PERMA-NUTS is available for the asking.



Tubular Rivet & STUD COMPANY
WOLLASTON (QUINCY) 70, MASS.

FASTEN AUTOMATICALLY BETTER and FASTER with TUBULAR'S RIVETS and MACHINES

MIDWEST OFFICE & WAREHOUSE — CHICAGO

BRANCH OFFICES: ATLANTA • BUFFALO • CHARLOTTE • DALLAS • DETROIT INDIANAPOLIS • LOS ANGELES • NEW YORK CITY • PHILADELPHIA • ST. LOUIS SAN FRANCISCO • SEATTLE

See your local classified directory for phone numbers

(*Concluded from Page 87*)

ry, glass blowing shop, a services section, and cleaning and storage areas. Other facilities include an infrared lab, physical, chemical, analytical, and distillation labs.

Buying Refinery Site

Kennecott Copper Corp. will buy 200 acres near Baltimore from the B. & O. Railroad to build an electrolytic copper refinery costing about $20 million. It will open in 1959 with an initial monthly capacity of 7000 tons and will employ about 450.

Blister copper will be supplied by Braden Copper Co., a Kennecott subsidiary in Chile. Some refined copper will be marketed in Europe.

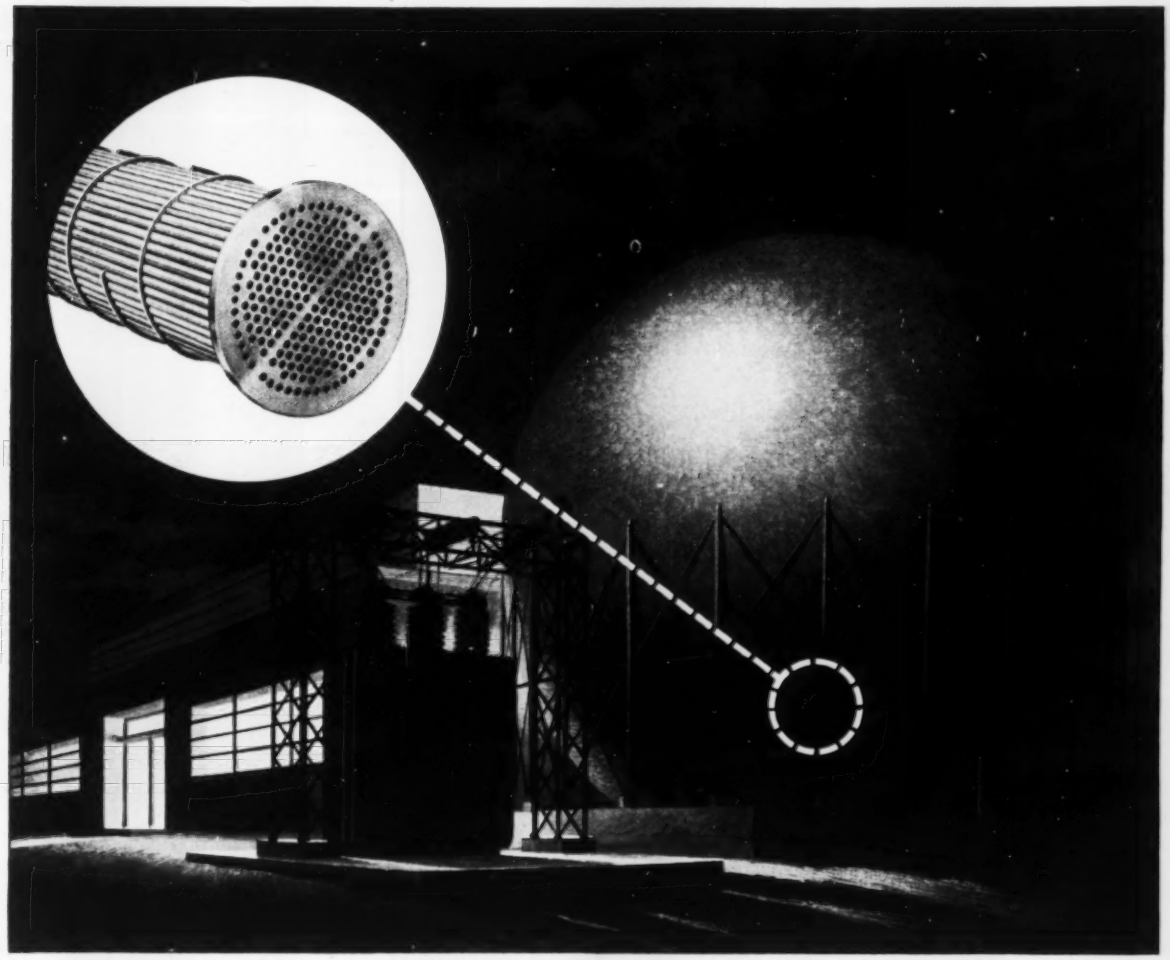
Facilities will include two main buildings, plus an office building, warehouse, and service installations. New copper casting and material handling equipment also will be added.

ASSOCIATIONS

As a result of a complete reorganization, the **Drop Forging Association,** Cleveland, will henceforth function through five division councils. Chairmen of the councils, composed of five to nine members each, are: Victor Brown, Kropp Forge Co., Chicago, marketing and education; W. A. Frazee, Steel Improvement & Forge Co., Cleveland, industrial relations; L. M. Fehrenbach, Indianapolis Drop Forging Co., Indianapolis, engineering and production; Victor F. Braun, Ladish Co., Cudahy, Wis., legislation and government relations; and W. A. Carlile Jr., Columbus Bolt & Forging Co., Columbus, Ohio, management aids.

Foundry Equipment Manufacturers Association Inc., Washington, elected these officers: President, Gordon E. Seavoy, Whiting Corp., Harvey, Ill.; and vice president, E. A. Borch, National Abrasive Co., Cleveland. C. R. Heller was re-elected executive secretary-treasurer.

Newly elected president of the **National Association of Sheet Metal Distributors,** Philadelphia, is



Nuclear reactor heat exchanger tubing must not fail

That's why Superior tubing is specified

When the count starts rising in a nuclear pile and the reactor goes critical, the heat exchanger begins its vital function. Reactor heat exchangers require tubing of the highest quality

This tubing must offer rapid and efficient heat transfer. It must be bright and clean, with extremely smooth ID and OD surfaces for uninterrupted fluid flow. Walls must be uniform throughout—no heavy sections to slow down heat transfer, no thin spots where scaling or corrosion might gain a foothold. Ductility is also important for fabrication ease. Excellent weldability is a prime requirement.

Superior has been supplying high quality tubing in a wide variety of analyses and sizes to heat exchanger manufacturers for many years. We produce to the most exacting tolerances and specifications. Get more information and free literature today on Superior tubing for atomic power. Write Superior Tube Company, 2005 Germantown Ave., Norristown, Pa.

Superior Tube

The big name in small tubing

NORRISTOWN, PA.

All analyses .010 in. to ⅜ in. OD—certain analyses in light walls up to 2½ in. OD

West Coast: Pacific Tube Company, 5710 Smithway Street, Los Angeles 22, Calif. • RAymond 3-1331

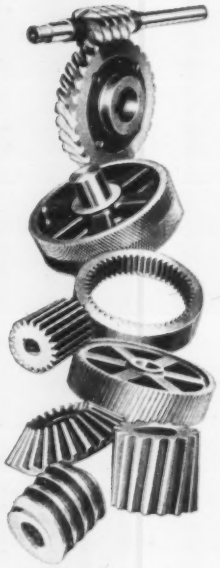
Gears with long useful lives . . .
the result of *high quality at H&S**

***Quality materials**
***Modern tooling**
***Superior workmanship**

Highly appreciated by the paper mill industry, for instance, are the large spur gears such as the one shown here. This gear has 140 teeth of 2 diametral pitch and 8″ face. It is being completed on a 100″ Fellows Gear Shaper that generates high quality external and internal spur gears up to 8″ face and 1½ D.P.

The modern Horsburgh & Scott plant is equipped with many new precision tools to meet today's demand for higher quality industrial gearing. You can judge our ability to serve you by these examples of size range:

Spur gears up to 156″ diameter
Helical gears up to 100″ diameter
Sykes Herringbone gears up to 60″ diameter
Bevel gears up to 77″ diameter
Worm gears up to 60″ diameter



You benefit by the exacting care that we exercise in every manufacturing step. Tell us your requirements; quotations will be sent by return mail.

A request on your company letterhead will bring a copy of the new H&S Gear Catalog 57 to help you design and order industrial gears.

THE HORSBURGH & SCOTT CO.
GEARS AND SPEED REDUCERS
5112 Hamilton Avenue
Cleveland 14, Ohio

L. F. Demmler, Demmler Bros., division of Anchor Sanitary Corp., Pittsburgh. Vice presidents are: A. B. Lewis, Palmer-Donavin Mfg. Co., Columbus, Ohio; and J. J. Worley Jr., N. B. Handy Co., Lynchburg, Va. T. A. Fernley Jr. is executive secretary.

National Tool & Die Manufacturers Association, Cleveland, elected these officers: President, P. R. Marsilius, Producto Machine Co., Bridgeport, Conn.; first vice president, Jack Kleinoder, Volkert Stampings Inc., Queens Village, N. Y.; second vice president, H. G. Murdock, Arrowsmith Tool & Die Corp., Los Angeles; treasurer, R. C. Renner, East Dayton Tool & Die Co., Dayton, Ohio; and secretary, James A. Perdy, Atlantic Mfg. Co., Philadelphia.

NEW ADDRESSES

Sales Promotion Dept. of **Electro Metallurgical Co.**, a division of Union Carbide Corp., moved to the fourth floor of a building at 535 Fifth Ave., New York 17, N. Y.

Reserve Mining Co. moved its public relations office from Duluth to the company's general office building in Silver Bay, Minn. Edward Schmid is director of the department.

U. S. Steel Corp., Pittsburgh, will consolidate the headquarters offices of its United States Steel Homes Div. in the Frick Bldg., that city. Manufacturing operations in the New Albany, Ind., and at the division's second plant in Harrisburg, Pa., will continue undisturbed.

CONSOLIDATIONS

Anaconda Co., New York, will acquire the **Cochran Foil Co.**, Louisville, subject to approval by Cochran stockholders.

American Can Co., New York, and **Marathon Corp.**, Menasha, Wis., will merge, subject to approval by stockholders. American Can makes metal and fiber con-

FERRO ALLOYS

. . . *a specialty with TENNESSEE*

Your specific ferro alloy needs can be met by Tennessee.

The highest quality ferrosilicon, ferromanganese, ferrochrome, and ferrochrome silicon, are available in a wide variety of analyses, grades, and sizes.

Briquettes containing exact quantities of alloy simplify control of cupola charges. Also available in lump and crushed forms. Shipped in bulk, in 250 and 500 lb. drums, or in one-ton pallets.

Truck deliveries from terminals in Chicago and Pittsburgh; fast service from warehouses in Cincinnati, Houston and the producing facilities at Rockwood, Chattanooga, and Houston.

Other Tennessee metallurgical products: pig iron and foundry coke.

Aerial view of Tennessee's new ferro alloy producing facilities at Rockwood, Tennessee.

TENNESSEE PRODUCTS & CHEMICAL *Corporation* NASHVILLE, TENNESSEE.

A Division of the Chemical, Paint and Metallurgical Department of Merritt-Chapman and Scott Corporation

CHEMICAL AND METALLURGICAL PRODUCTS • BUILDING MATERIALS

A welder caused us to caucus

The note from an employee suggestion box read "How come a company like this hasn't got the U. S. Savings Bond Payroll Savings Plan". It was signed by a welder in the fabricating department.

Since we actually *do* have Payroll Savings this told us two things: (1) Probably more employees than we imagined wanted the advantage of buying U. S. Bonds automatically through Payroll Savings. (2) We had grown lax in bringing our Plan to their attention.

But what to do? The solution was simplicity itself.

We called in our State Savings Bonds Director. He provided all the promotional materials needed to arouse interest in U. S. Savings Bonds. Then he helped to conduct a personal canvass and place an application blank in everyone's hands.

The results were amazing. Employee participation shot up to a percentage that we could take pride in. There was no "hard selling", nor was work interrupted. Our people wanted the security U. S. Savings Bonds offer them.

Today there are more Payroll savers than ever before in peacetime. Your State Director will be happy to help you install a Payroll Savings Plan or build enrollment in one already existing. Look him up in the phone book or write: Savings Bonds Division, U. S. Treasury Dept., Washington, D. C.

STEEL
The Metalworking Weekly

THE U. S. GOVERNMENT DOES NOT PAY FOR THIS ADVERTISEMENT. THE TREASURY DEPARTMENT THANKS, FOR THEIR PATRIOTIC DONATION, THE ADVERTISING COUNCIL AND THE DONOR ABOVE.

tainers; Marathon produces pulp, paper, and paperboard.

Jefferson Electric Co., Bellwood, Ill., producer of electrical components, will purchase Electronic Products Corp., Santa Barbara, Calif., subject to approval by the latter's stockholders. The California firm is a major manufacturer of custom cables and electronic assemblies for the guided missile industry.

Peninsular Distributing Co., Detroit, purchased **Rayl Industrial Supply**, a division of Rayl Co., that city, and made Leonard F. Joseph division manager.

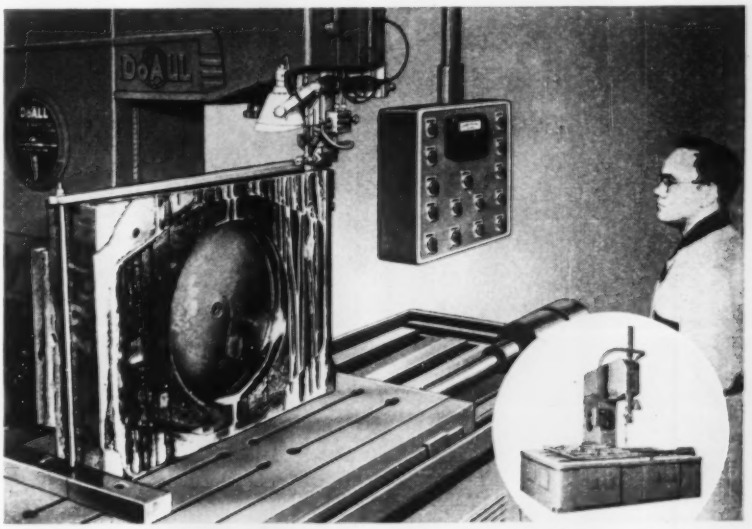
NEW PLANTS

Central Screw Co., Chicago, opened an 80,000 sq-ft plant at Frankfort, Ky. The firm also has awarded contracts for tripling its facilities at Los Angeles. Central is a major supplier of cold-headed fasteners (machine and tapping screws, lock washer assembly screws, and allied products).

Dooley Steel Corp., San Diego, Calif., constructed a 15,000 sq-ft plant adjacent to existing facilities. It will increase production capacity by 80 per cent.

Victor Equipment Co., San Francisco, acquired additional frontage adjoining its plant on Folsom Street. This will enable the firm to expand its facilities at the main plant. Victor also is constructing a building at the rear of the Folsom Street property.

Joseph T. Ryerson & Son Inc., warehousing subsidiary of Inland Steel Co., formally opened its steel service plant at Mt. Holly and Chemway Roads, Charlotte, N. C. It replaces the former leased quarters in the city. The new facility represents an investment of over $1 million for building and equipment, including a high speed friction saw for cutting structural steel, plate and sheet shears, hacksaw, bar and angle shears, and mechanized flame cutting equipment. Wilson A. Young is general manager of the new plant.



New band mill introduces major time savings in machining large work pieces.

Blessed Event for Everyone

Fantastic growth opportunities lie ahead for the American economy—if the development and use of newer, better "tools" can be accelerated. This requires a more widespread understanding that the birth of a better, faster tool is a blessed event of real significance to everyone . . . and that such tools are created only by the savings of the thrifty and the profits of business.

The picture above illustrates the principle. A new machine tool, called a band mill, is being used to reface a die block that forms washing machine parts. This machine tool employs a thin continuous-cutting saw band, made of high speed steel, which rapidly and accurately "slices off" the unwanted metal. The band mill does the die block job in about half the time required by previous machines.

The band mill opens up many opportunities to effect major savings in time, material and labor in the machining of work pieces measuring up to 18" high by 26" wide and weighing up to two tons.

With such a tool a man can turn out more work per hour. Thus, he can produce the greater volume of goods and services required for a growing population and a higher standard of living. And, when enough of such tools are "born" and put to work, better living for more people will be possible. It's as simple as that. Good living, short hours and high wages depend on individual productivity. Only with more and better tools can people increase their productivity.

Better home laundry equipment at a price people can afford—thanks to better tools like the band mill illustrated.

Reprints of this series on economics plus "economic kits" available for employee education.

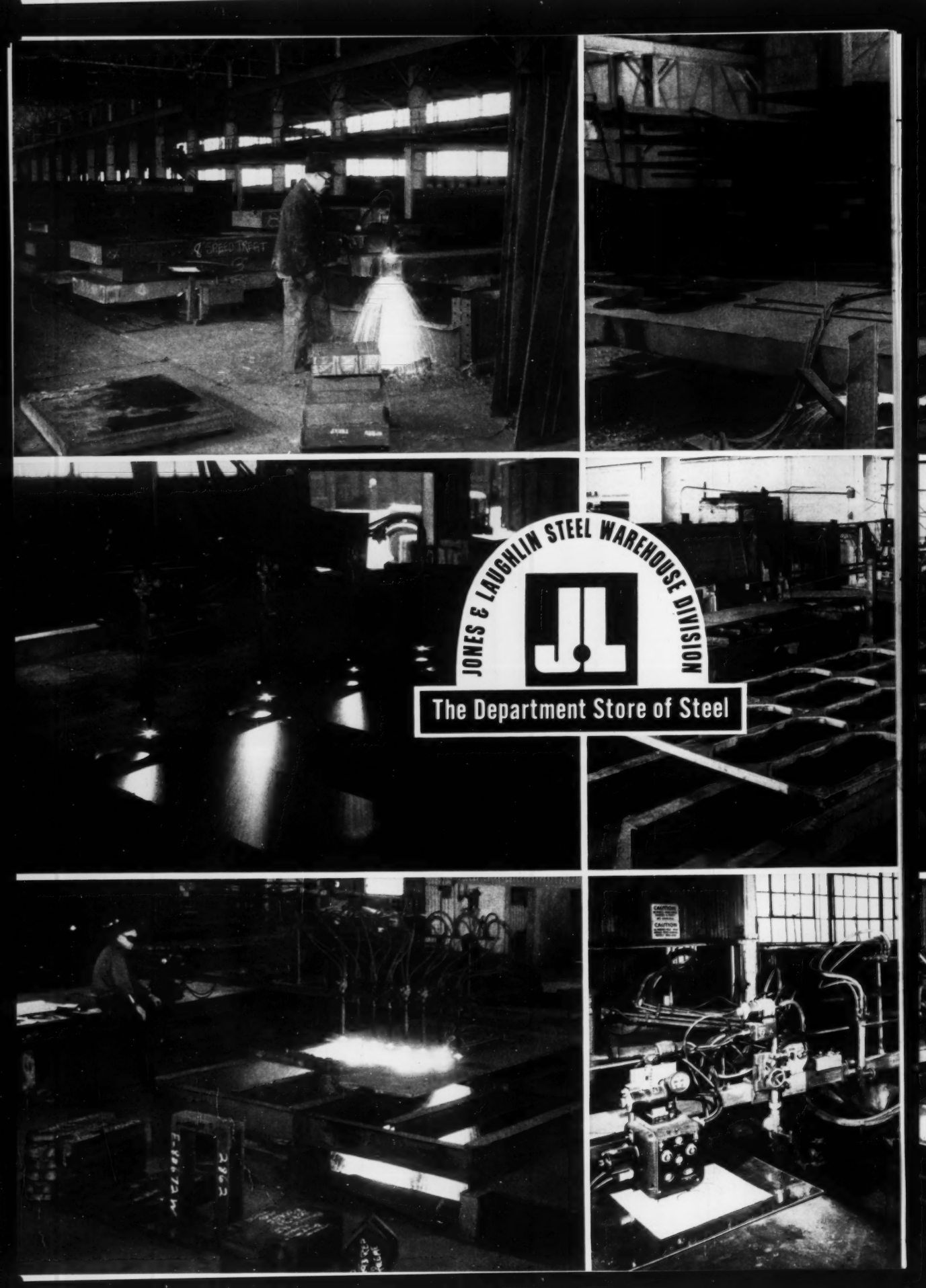
E-101N

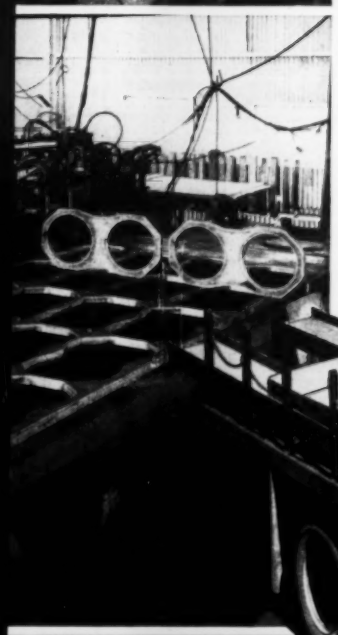
ASK FOR NEW LITERATURE describing the DoALL band mill and other DoALL band machines for slotting, splitting, notching, contour sawing and other machining operations. Call DoALL locally or write.

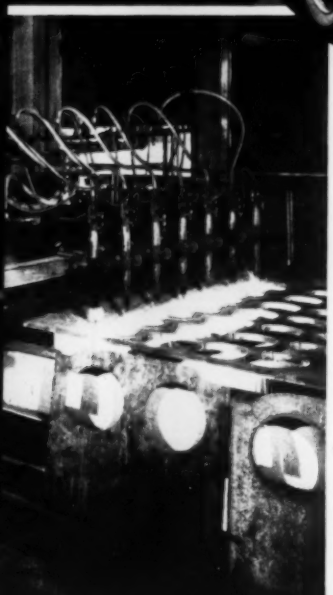
The DoALL Company

Des Plaines, Illinois

38 Local Sales-Service Stores


JONES & LAUGHLIN STEEL WAREHOUSE DIVISION
JL
The Department Store of Steel





the steel you want *flame-cut* to your specifications

You can have as much—or as little steel as you need, on a moment's notice, from your J & L Steel Warehouse. You can order J & L steel plates flame-cut to *your* specifications—and save on machining time, reduce your inventory and handling costs, and increase your factory production space. It's smart business to use your J & L Steel Warehouse as your Department Store of Steel.

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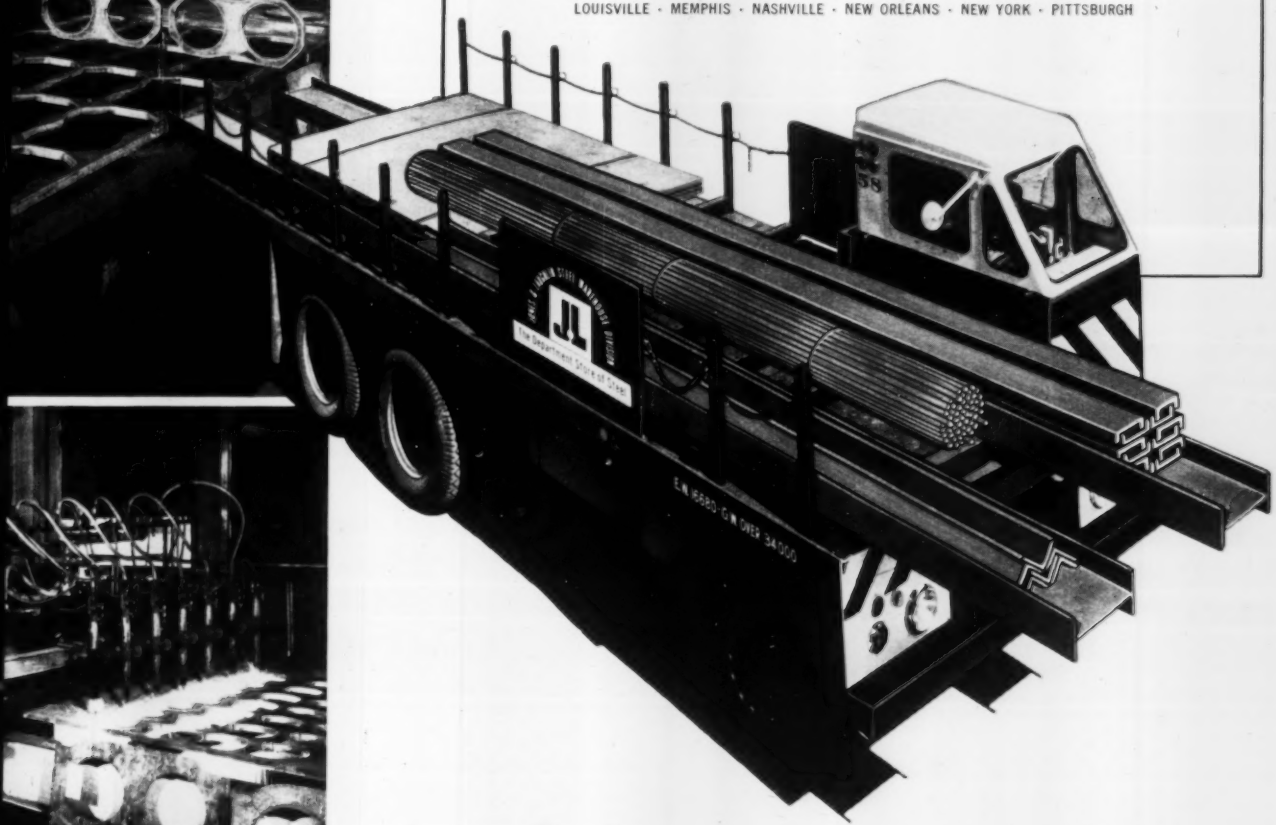
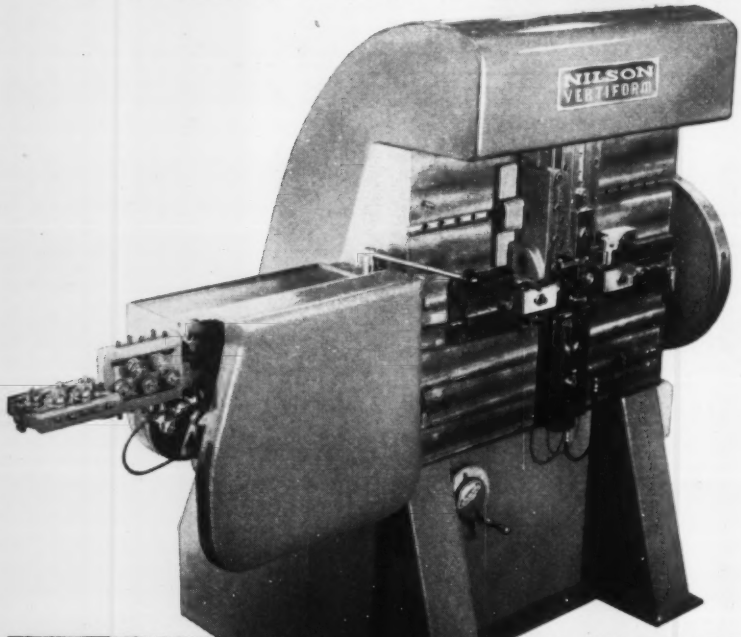


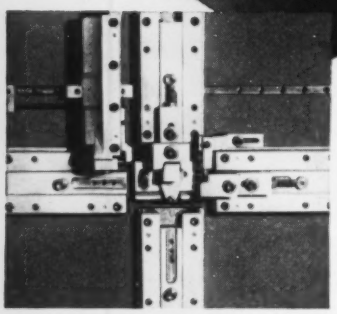
JONES & LAUGHLIN STEEL WAREHOUSE DIVISION
JONES & LAUGHLIN STEEL CORPORATION

DIVISION OFFICES INDIANAPOLIS 7, INDIANA

NEWEST

CONCEPT IN FORMING





NILSON VERTIFORM

Our LATEST DEVELOPMENT—

Applying 4-Slide Forming Techniques To A Vertical Machine.

Designed For Rapid Tooling Set-Up And Ease Of Operation.

MACHINE SPECIFICATIONS #V-187

- Max. diam. wire—inches ..... .187
- Max. length of feed—standard 15"
- Max. length of feed—with change gears ..... 30"
- Max. width ribbon metal ..... 1¼"
- Stroke of forming slides ..... 2½"
- HP. required 2
- Machine speed—standard 30-120 RPM
- 4 and 20 ton Press Attachments available.

ADVANTAGES OF THE NILSON VERTIFORM

1. Greater Tool Accessibility
2. Unobstructed View Of Product Being Formed
3. Forming Slide Units Removable and Interchangeable
4. Less Floor Space Required
5. Operator Safety (Most Moving Parts Enclosed)
6. Automatic Oiling Of Entire Machine

Write To Our New Plant For VERTIFORM CATALOG

THE A. H. NILSON MACHINE CO. 1512 Bridgeport Ave., Shelton, Conn.

NILSON

Program for Management In 1958

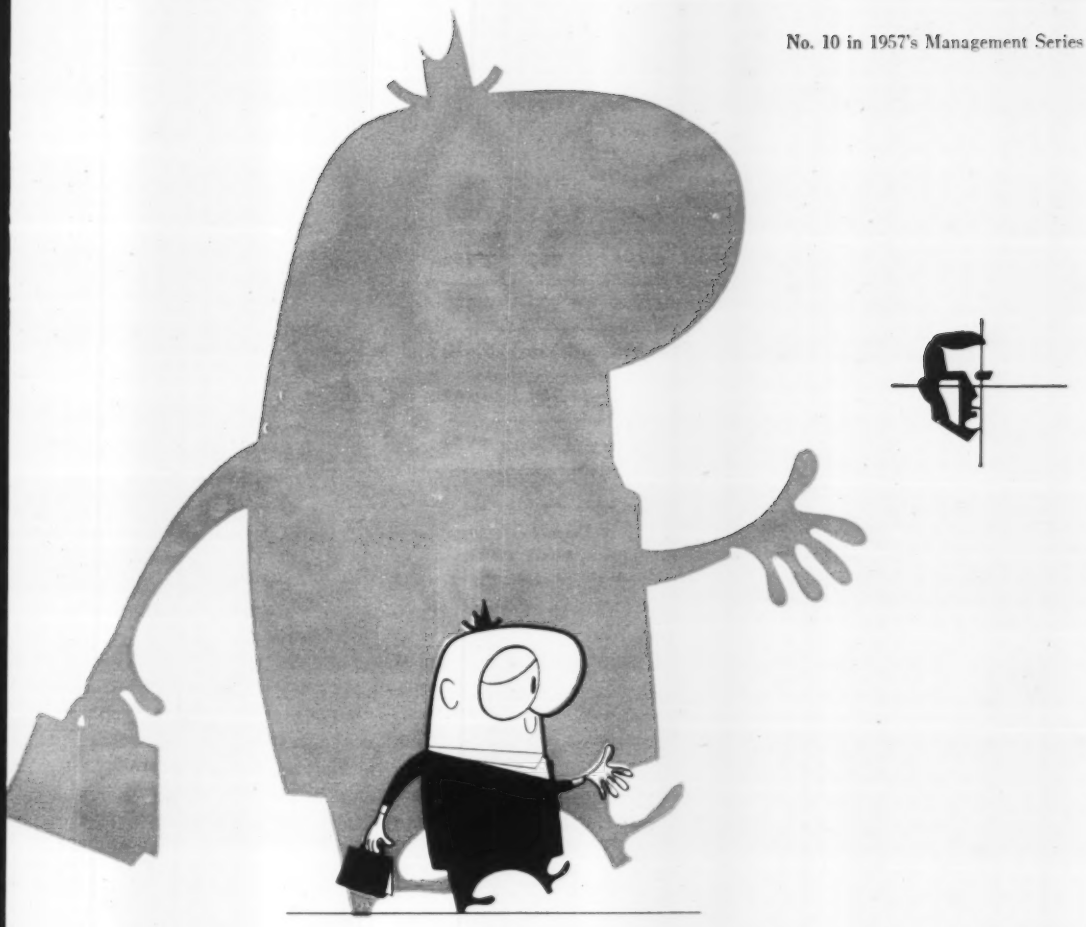
The small business article beginning on the opposite page concludes our ten-part Program for Management—1957. STEEL's 1958 series begins Feb. 17.

The theme of next year's program will be: Planning for profit in a high-plateau economy. Ten articles will deal with profit planning in marketing, production, engineering, research, labor relations, and other management areas.

● The 1957 articles are:

1. **The Care and Feeding of the Junior Executive**
   (Feb. 11, Page 93)
2. **Grooming Middle Managers**
   (Mar. 18, Page 93)
3. **Profit Sharing**
   (Apr. 15, Page 115)
4. **Inventory Management**
   (May 13, Page 109)
5. **Managing Our Markets**
   (June 17, Page 93)
6. **Research: Threshold to the Future**
   (July 15, Page 93)
7. **Producing for the New Technology**
   (Aug. 12, Page 113)
8. **Dealing with Workers**
   (Sept. 16, Page 119)
9. **Make or Buy?**
   (Oct. 14, Page 105)
10. **Small Business: Its Place in Our Future**
    (Nov. 11, Page 99)

Extra personal copies of these Program for Management articles are available until the supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.



Small Business

Its Place in Our Future

A SURFEIT of sentimental nonsense has been written about small business, but only crepe hangers have any reason to fear a realistic diagnosis of the facts.

The patient will live. In fact, he really isn't sick. He has aches and pains here and there, but who hasn't?

Evidence—You don't have to go any farther than the small businessman himself to confirm that view.

Dun & Bradstreet Inc. did to get information for the President's Conference on Technical & Distribution Research for the Benefit of Small Business in Washington this fall.

Here are the answers it got:

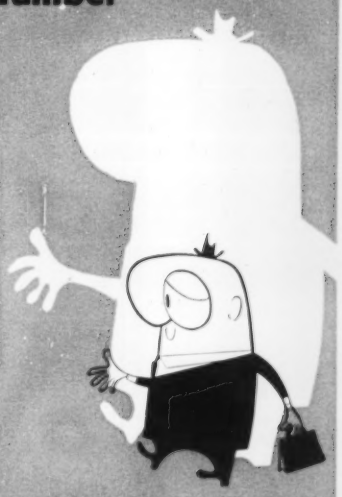
Four out of five small businessmen think they have made progress; three out of four say they will continue to grow; only two out of every 100 intend to liquidate (see Pages 102 and 103).

Observation — The survey prompted J. Wilson Newman of D&B to make these remarks:

"On the basis of the information, I am tempering my views of the charge that the little man in business is fighting a losing battle for survival . . . I believe we have permitted the complaints of a minority to color our concept out of all resemblance to the facts. There are some justifiable complaints against unfair competition; there may be some glass-eyed bankers who turn down good loans; there are suppliers of merchandise who are guilty of discriminatory and unethical practices, but the decibel rating of the complaints is out of

Small Metalworking Plants Double in Number

SIZE OF PLANTS (Number Employees)	1946	1947	1948	1951	1952	1957
500 or more	2,426	1,819	2,161	2,325	2,325	3,050
SMALL PLANTS: 100-499	5,359	5,543	5,520	5,796	5,863	7,982
SMALL PLANTS: 50-99	3,614	4,411	4,294	4,503	4,503	6,340
SMALL PLANTS: 20-49	3,747	4,519	4,580	8,341	8,341	9,640
Plants 20-499	12,720	14,473	14,394	18,640	17,707	23,962
% of all plants	84%	89%	87%	89%	89%	89%



Sales of small plants (employing less than 500) as a percentage of sales for all metalworking plants employing 20 or more has stayed at about a steady 30 for more than a decade. Figures on organizations employing less than 20 aren't included because they aren't available for every year. Source: STEEL and Census Bureau.

all proportion to the evidence we find in the market places of the nation."

Adds S. S. Inch, vice president and director of sales for Kaiser Aluminum & Chemical Corp.: "Big business 'versus' small business has almost become a cliche . . . I believe the vast majority of businessmen, no matter what size business they represent, do not feel or act in a manner that justifies the implications of the word 'versus.' "

More Evidence—Statistics can be used to perpetuate the "versus" myth.

This set of raw figures, for example, may give you a general impression that is misleading: The nation has 4.3 million businesses; 4 million are small, each employing, roughly, less than 500. They represent only 65 per cent of the work force and account for only 45 per cent of gross sales dollars.

More realistic information may be obtained by looking at an industry. Data in the table above, for example, show that small metalworking firms account for 89 per cent of the industry's business population now, compared with 84 per cent in 1946. Their percentage of industry sales has stayed at a steady 30 per cent for over a decade. During the same period, their percentage of industry employment has held at around 35 per cent.

Down to Brass Tacks—Some business problems are universal. Some are related to the size of the enterprise, whether it is large or small.

At the Washington conference, three groups were asked to rate the basic problems of small firms. Executives from large companies put research and development needs at the top of the list; they rated personnel and financing next. Government leaders said financing was first, then personnel and research. Small businessmen thought financing problems led the list; they rated personnel, marketing, and research troubles next. All three groups put production and government relations problems at the bottom.

Let's take a closer look at how small business can better cope with financing, personnel, marketing, research, government relations, and production.

Financing

Acquire a good relationship with a banker, advises Clifford D. Cooper, president of Cooper Development Corp., Monrovia, Calif. "I have always used my banker as an adviser and found him most helpful," he says, "as long as I took him into my confidence and my planning."

A good idea is to "plan the work —then work the plan." Make up a budget and cash forecast for several months, showing your estimated sales, costs, expected profits, amount needed in bank loans. Allocate the amount of funds available, if any, to spend for fixed assets. When you plan the work like that, your chances of borrowing money are improved, so you can work the plan.

Borrow for the Future—It's a legitimate way of conducting business, although many a small businessman still has scruples about it. Young presidents don't. Three of four firms whose chief executives belong to the Young Presidents organization borrowed last year. Five of seven got short-term money with ease. Two of five, however, couldn't get enough long term financing.

Your local commercial bank is the first place to apply. If you don't succeed, try a commercial paper house, factor, industrial fin-

nance company, personal finance company, investment banker, or, last, the Small Business Administration.

Search for Capital—The investment banker is too often neglected by small business, but he may be able to help more than any other financial agent by finding outside capital. That's often a little company's primary problem, although the owner does not or will not admit it. Outside capital can aid growth, expand the credit base of the company, reduce risk by dividing ownership, provide directorships that bring additional valuable management counsel.

Concentrated ownership, when the stock is not listed publicly, narrows the credit base for loan purposes. "Owning part of a thriving business is better than owning all of an ailing one," says William Crane of Saunders, Stiver & Co., Cleveland investment house.

The National Association of Securities Dealers, Washington, lists 3757 members. Throughout the country, they are in close touch with each other and keep tab on venture or investment capital. The cost of this type service is geared to the accomplishment. A fee is charged only if the venture succeeds.

Hunt for Cash — SBA is the court of last resort. Its loans are made to: 1. Finance construction, conversion, or expansion. 2. Finance the purchase of equipment, supplies, or materials. 3. Supply working capital.

To be eligible, a firm must be: 1. Independently owned and operated. 2. Not dominant in its field. 3. A small business employing less than 250, or between 250 and 1000, depending upon the standard SBA has adopted for that industry. 4. Able to repay from income. 5. Unable to get private financing.

The maximum loan is $250,000. Usually, a decision is reached within three weeks after application.

Personnel

A survey of ten small companies by the American Management Association reveals that 50 per cent thought their most serious difficulties were related to personnel.

A maker of steel kitchens employing 320 can't progress in personnel development and executive replacement. A structural steel fabricator with 100 workers is struggling to move away from one-man management. A foundry employing 625 finds its biggest challenge is recruiting potential managers. A producer of building supplies, with 125 employees, finds trouble in assigning special jobs to company officers. A 115-employee machinery maker has had little success developing a team operation.

All in the Boat—Every company, regardless of size, has personnel troubles. But a small firm's difficulties are special because its management has to be a one, two, or three man band. The owner tends to be a do-it-yourselfer, somewhat scornful of highfalutin ideas such as management training.

Yet even small companies must do more recruiting and training of management personnel. James G. Garwick, regional director in Cleveland for SBA, suggests:

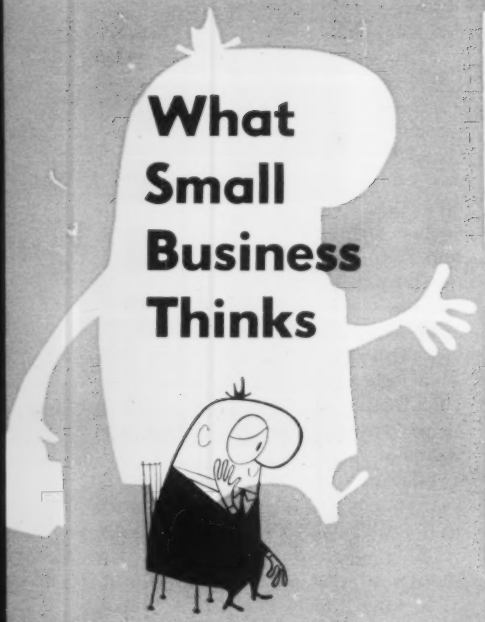
1. In recruiting, try the smaller colleges; also be on the lookout for some bright young man with experience who is tired of the institutionalized features of big companies.
2. Watch out for the specialist—he's usually not for you.
3. Start training by putting a blue collar on your prospect. Send him through all operating functions of the shop.
4. Then send him out to sell.
5. After that, put him to work with the head of each department.
6. Keep him informed of his progress and where he's headed.
7. Give him a problem. Better,

Small Plants Do $47 Billion In Metalworking Business

SIZE OF PLANTS (Number Employees)	NUMBER OF PLANTS	PER CENT OF PLANTS	PER CENT OF BUSINESS POTENTIALS*
500 or more	2,385	3.5	65.6
250-499	1,994	2.9	10.6
100-249	4,214	6.2	9.9
50-99	5,193	7.6	5.3
20-49	10,412	15.3	4.7
10-19	10,345	15.2	2.0
5-9	10,929	16.0	1.1
1-4	22,731	33.3	.8
TOTAL	68,203	100.0	100.0

*Percentage of business potential is arrived at by averaging the percentage of value added by manufacture and the percentage of total employment. Plants employing 1 to 499 did 34.4 per cent of the metalworking business in 1954, the latest year for which Census Bureau figures are complete enough to make the calculation. That 34.4 per cent applied to 1957's expected $138 billion metalworking volume puts small business' share at $47 billion.

What Small Business Thinks



1. What has been the history of your business over the last five or ten years?

Has grown	84.5%
Has gone backward	4.7
Has stood still	10.8

2. How do you rate your company's future?

It will grow	82.9%
It will go backward	3.9
It will stand still	12.4
Don't know	0.8

3. What's your strongest asset?

Nothing in particular	25.9%
Service and customer relations	14.7
Quality of products and service	17.2
Ability, reputation, and experience	14.7
Competent personnel	4.3
Equipment and facilities	7.7
Flexibility	6.0
New products	5.2
All other	4.3

(Percentage of replies from 126 manufacturers interviewed by Dun & Bradstreet)

let him find one. If he solves it efficiently, head him in the direction of the management position it represents.

Case in Point—Take Pheoll Mfg. Co., Chicago fastener maker. When its president, Mason Phelps Sr., died, its net income slid from $1 million plus in 1947 to $204,000 in 1954. But the company has recovered. When its fiscal year ended last June 30, its net income had climbed back to more than $1 million, compared with $784,972 the year before.

The quick revival was largely the work of a new management team—headed by Mason Phelps Jr., who was only 28 when he became president. Many top executives at Pheoll are only in their thirties.

Most experts agree: Good management training is the key to solution of many personnel problems. With it you can attract promising young men. With it you can build a reservoir for executive replacement. With it you can move away from one-man management. With it you can find people who are capable and will accept responsibility. With it you can develop a team operation.

Without management training, you'll have trouble overcoming small business' greatest psychological fault, the know-it-all complex. Even for the small manufacturer, business is too complex for one head.

Marketing

"Continued good hard selling took us out of the recession of 1954," says Dr. Arthur Burns, former chairman of the President's Council of Economic Advisers.

Small business does more marketing than any other segment of our economy. "Yet, many small businessmen are afraid of marketing research," says Arthur H. Motley, president and publisher of *Parade* and one of the nation's top sales personalities. "Such words as 'market potential,' 'selective analysis,' or 'probability sampling' scare them to death."

Without Knowing — The small businessman may be doing market research now and not recognize it as such. The manufacturer who interviews his salesmen on field conditions is doing it, as are the salesmen who report product preferences among customers, and the controller who notes that profitability among lines varies.

The manufacturer often can get market research data cheaply. Practical help can be obtained from commonly available sources —business magazines, trade associations, government agencies, competitors, suppliers, customers. General Electric Co., for example, offers such aid to wholesalers and retailers of electronic products. Census Bureau figures are the basis of many business statistics. They are often broken down and made more meaningful for small companies by magazines, trade associations, and local chambers of commerce.

Case in Point—Original marketing research isn't always expensive. Wedemeyer Electronic Supply Co., Ann Arbor, Mich., saved selling expenses and improved selling efficiency by determining that a salesman could not economically travel over 100 miles a day.

A producer of special fasteners made a market study that led him to shift from direct salesmen to agents to improve his coverage and sales and cut selling costs. The expense of the study was less than $500.

4. Do you have plans to help you increase sales?

Nothing in particular	44.9%
Will add new lines or products	27.6
Will advertise more extensively	3.2
Will open new branches or new accounts	0.0
Working on new designs and patents	12.6
Will feature better promotion and service	3.9
Will add new equipment	3.9
All other	3.9

5. What's the source of your principal competition?

Large companies	34.5%
Newcomers	14.8
Similar size concerns	50.7

6. How do you view your future opportunities?

Bright	34.7%
Good	53.8
So-so	6.9
Poor	4.6

7. Do you plan to remain in business?

Yes	97.6%
No	0.8
Don't know	1.6

8. Would you sell out if you could get a fair price?

Yes	10.9%
No	79.8
Perhaps	5.4
Don't know	3.9

Marketing research work is needed on whom to sell. For small metalworking firms, the answer is usually another manufacturer — and it'll probably be a large company. National Cash Register Co., Dayton, Ohio, puts it this way: "It's doubtful if the factory could be operated efficiently without the services supplied by small suppliers."

President Harlow H. Curtice of General Motors Corp. says: "The small supplier and the large manufacturer are partners. Each is dependent on the other." GM has 26,000 suppliers today, compared with 21,000 in 1955; 89 per cent of the 26,000 employ fewer than 500. In 1955, about half the GM sales dollar went to suppliers.

Pointers—"We want representatives that can give us the information we need when we want it," say purchasing officials of Westinghouse Electric Corp. GM (and other large firms) suggests that venders come prepared with this information:

1. The vender's (or his representative's) name, address, and telephone number.
2. Date company was established.
3. Size of plant.
4. Number of employees.
5. Principal products.
6. Location of plants.
7. Description of production and transportation facilities.
8. Approximate yearly sales volume.
9. List of three representative customers.
10. Financial and credit rating.

Someone has said: "There's nothing wrong with small business' marketing that better information won't remedy."

Research, Development

National research and development expenditures currently run between $5 billion and $6 billion annually. Yearly gains are at the rate of about 10 per cent—four times faster than the growth rate for the gross national product.

Yet, research and development by small business is about where it was with big business 20 years ago. Only 8.3 per cent of all companies employing 8 to 99 workers have organized research programs. Only 22.4 per cent of companies with 100 to 499 workers use organized research. Among larger companies, 42.3 per cent of the 400 to 999 group do research; 60.2 per cent of the 1000 to 4999 employee organizations have programs; and 94.3 per cent of the firms hiring more than 5000 do organized research.

Five Barriers — Five barriers block greater use of research by small business, says Lyle M. Spencer, president of Science Research Associates, Chicago:

1. Few small business people realize the urgency of research and development. The number of research laboratories has grown from 1000 in 1930 to nearly 5000 today and the number of research scientists from 50,000 to a whopping 250,000.

2. The financial risk of research is too high and the results too uncertain to take the gamble. Even the most successful companies have a 50 per cent failure rate in new product development, and the average firm with well planned research has only one success out of three projects.

3. Research is too expensive, and the payoff takes too long. The average cost for a professional research man is about $27,000 a year. A management consulting

firm advises against setting up your own research and development department unless you're prepared to take a minimum financial commitment of $100,000 annually for at least five years before expecting the operation to pay off. The leadtime between the inception of an invention and its profitable marketing averages between five and seven years in a wide variety of industries, says Mr. Spencer.

4. Even if research is wanted, most small companies lack and can't borrow the money to finance development.

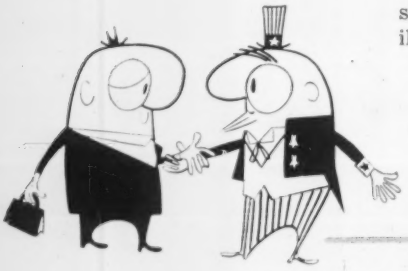
5. Even if a research program could be financed, few small businessmen know how to plan, staff, or run such a program.

What can the small businessman do?

These approaches stand out: 1. He can resort to limited research by farming out carefully selected jobs to an outside organization. 2. He can participate in co-operative research through trade associations or other organizations. 3. He can take advantage of other (usually large) companies' research through licensing or similar arrangements.

Farming Out—Diamond Expansion Bolt Co. Inc. needed a new product. The Garwood, N. J., maker of special fasteners contracted with Arthur B. Little Inc. to come up with one. It did—a small, one piece, hollow wall fastener. The project was so successful that the company felt justified in signing a contract with Little for $2000 a month to continue product research.

Co-operation—The National Association of Aluminum Distributors has just completed a research project on the problems of crating and packaging aluminum sheets and tubing. At an average cost of $300 per member, the project paid off in new crating and packaging methods which are expected to reduce



HOW THE GOVERNMENT HELPS

TECHNICAL SERVICES

Office of Technical Services, Department of Commerce . . .

- Assembles and distributes information resulting from government or government sponsored research which is not classified.
- Answers questions from small firms and big firms.
- Publishes: *U. S. Government Research Reports, Technical Reports Newsletter, Patent Abstract Series & Supplement, Developing & Selling New Products.*
- Supplies photostats or microfilm reproductions of Atomic Energy Commission reports which are not available in printed form or classified.
- Works with business groups on standardization problems.

Office of Distribution, Department of Commerce . . .

- Provides marketing information, including data on product development, use of materials, trade practices, operating and accounting systems, business locations, and sales training.
- Publishes reports on operating ratios and materials to aid wholesale, retail, and service firms in estimating their capital requirements.
- Makes special analyses of Census Bureau data to evaluate market potentials.
- Publishes: *Distribution Data Guide*, Business Service *Bulletins.*

Business & Defense Services Administration, Department of Commerce . . .

- Aids businesses with production problems. Large and small firms are represented on its Industry Advisory Committees which maintain continuous contact between business and government.
- Collects data on industry conditions and new product and technological developments.
- Advises other government agencies on their relations with business.
- Advises business on its relations with other government agencies.

Bureau of Foreign Commerce, Department of Commerce . . .

- Offers various services to firms doing business abroad.
- Evaluates specific opportunities for foreign business.
- Prepares detailed reports on foreign commerce.
- Maintains lists of business concerns abroad.
- Publishes: *Foreign Commerce Weekly.*

Office of Internal Trade Fairs, Department of Commerce . . .

- Tells how you may participate in foreign trade fairs.

National Bureau of Standards, Department of Commerce . . .

- Tests materials.
- Develops codes and specifications of physical standards.
- Gives small firms opportunity for co-operative research through NBS facilities.
- Publishes: *Journal of Research and Technical Newsletter.*

Office of Area Development, Department of Commerce . . .

- Assists groups in setting up programs of economic development.
- Serves as a clearing house for data on federal programs which aid community development.

Field Service Offices, Department of Commerce . . .

- Provide immediate and direct contact with business.
- Maintain field libraries with material of interest to businessmen.
- Offer help in bidding on government contracts, applying for financial aid and special tax benefits, and starting new businesses.
- Report on local business conditions.
- Publish: *Synopsis of U. S. Government Proposed Procurement, Sales & Contract Awards.* It lists invitations to bid, requests for quotations on negotiated contracts, set-asides for small firms, contract awards, and scheduled surplus property sales.

Small Business Administration . . .

- Counsels on finances, management, markets, new products, and government contracts. SBA has 15 regional and 25 branch offices.
- Lists items and services bought by the government (*U. S. Government Purchasing Directory*).
- Describes government specifications (*U. S. Government Specifications Directory*).
- Publishes abstracts of patents available to small firms, including privately owned or government owned inventions and opportunities opened up by successful prosecution of antitrust cases.
- Publishes: *Management Aids for Small Manufacturers, Technical Aids for Small Manufacturers, Small Marketers Aids, Small Business Management Series.*

Armed Services Technical Information Agency . . .

- Distributes technical reports to firms with military contracts.

Technical Information Service, Atomic Energy Commission . . .

- Issues access permits for classified documents.
- Provides classified and nonclassified engineering drawings for research and testing of civilian uses of atomic energy.
- Maintains 77 libraries of nonclassified atomic energy reports.
- Publishes: *Nuclear Science Abstracts.*

Business Service Centers, General Services Administration . . .

- Offer data on government procurement and surplus property disposal.

Department of Labor . . .

- Prepares special reports on manpower.
- Tests aptitude of workers.
- Recruits and places workers.

TAX BENEFITS

1. Corporation income up to $25,000 is exempted from the 22 per cent surtax.
2. Up to $60,000 of retained income is exempt from the penalty tax for the unreasonable accumulation of surplus income. (The burden of proving that a firm has retained income in unreasonable amounts rests with the government.)
3. If more than 35 per cent of the gross estate or more than 50 per cent of the taxable estate consists of stock in one corporation, the stock may be redeemed to pay estate taxes of an owner (the distribution is not viewed as a dividend).
4. For two years, a corporation has the right to use losses incurred in one year to offset income earned in previous years.
5. Certain partnerships may be treated as corporations for tax purposes.

freight damages, save $50 a day in labor, and $100 a day in materials. Not counting lower freight damage, each member's investment will be repaid in two days.

Licensing—Western Electric Co. Inc. has given about 60 companies (many of them small) licenses to make transistors. Testifies one licensee, Texas Instruments Inc., Dallas: "For us the license led to a commercial breakthrough in silicon transistors." Classified as a small firm when it got the license in 1952, the company is now in the medium range and still growing.

Small business has some catching up to do in research and development. More than half of big company sales stem from products unknown before World War II. Small business should be able to —but can't say the same.

Government Relations

Despite occasional noises in Congress, small business is not unduly alarmed about its relations with the government.

Improvement — The amount of defense work being done by small business will probably surprise you: 19.8 per cent of the prime dollars awarded by Defense Department contracts in fiscal 1957 went to small business, compared with 19.6 per cent in fiscal 1956. Some 20 per cent of the dollar value of all primes that are subcontracted goes to small business in the first tier of subcontracting.

About 30 per cent of Defense Department dollars could go to small business, but it's getting only about 52 per cent of that potential. It could get more by being more competitive, believes Joseph M. McKellar of McCulloch Motors Corp., Los Angeles. He recently returned to his company after a stint as director of small business policy for the Defense Department.

One of small business' most serious deficiencies is its failure to take full advantage of the help government offers (for high spots on what that is, see the accompanying exhibit).

Production

Here's another surprise: Less than 5 per cent of all small businessmen are concerned about production, according to a survey made for the small business conference.

"We can make it; the job is to sell it," is a typical comment.

Most production problems boil down to personnel or research questions—how to manage production, or how to use research to lower costs and boost productivity.

Advantages of Being Small

Small business has six major problems inherent in its size. But it also has a natural benefit: Flexibility. It is most readily apparent in:

Delivery—While a larger company may have hundreds of jobs in the works, each with a different delivery schedule, the small company has relatively few to schedule and can give more attention to them.

Short Run Economy — Small companies are in a better position to handle small orders than large firms geared for mass production. It puts them in a good position to handle emergency orders, or to become secondary sources of supply for high volume items.

Production Control—If it is necessary for the purchaser to step up, cut back, or cancel production of a vender's part, a phone call to the small shop gets almost immediate results because of the short

FINANCIAL ASSISTANCE

SBA offers . . .

- Direct loans to firms unable to obtain private credit.
- Participation loans with banks and other lending institutions where it: 1. Advances part of the money. 2. Guarantees to purchase part of the loan from the lender at a later date.
- Loans at prevailing local rates. Interest can't exceed 6 per cent.
- Pool loans to corporations formed and capitalized by small firms to produce or acquire raw materials or supplies. Maximum amount of a loan: $250,000 times the number of small firms in the pool.
- Loans to firms affected by floods, storms, and natural disasters.

Veterans' Administration . . .

- Guarantees business loans made by private lenders to eligible veterans of World War II or the Korean War.

Victory Loans . . .

- Government procurement agencies guarantee loans made by private lenders to their contractors to carry out the contract work.
- Maximum interest: 6 per cent.

Progress Payments . . .

- Procurement agencies give contractors payments based on percentage of the contract completed, or on a percentage of the total costs incurred to complete the contract.
- Financial need is not a factor in their availability.
- Partial payments are available, based on delivery of the contract items.

Defense Minerals Exploration Administration . . .

- Bears 50 to 75 per cent of the cost of exploring for strategic or critical minerals. Assistance is repaid if discovery and development result.

Treasury Department . . .

- Makes direct loans for purposes essential to defense.

CONTRACT ASSISTANCE

Set-Asides . . .

- Defense Department, General Services Administration, Veterans' Administration, Departments of Interior, Commerce, Agriculture, and Post Office set aside a percentage of their contracts for small firms.

Subcontracting . . .

- Defense Department requires contractors to subcontract to small business the maximum amount which the contractor determines to be consistent with the efficient performance of the contract.
- For contracts of more than $1 million, Defense Department urges the contractor to: 1. Publicize its willingness to subcontract to small firms. 2. Adopt procurement policies which give small firms as good a chance to get subcontracts as large firms. 3. Report to Defense on the success of its small business subcontracting efforts.

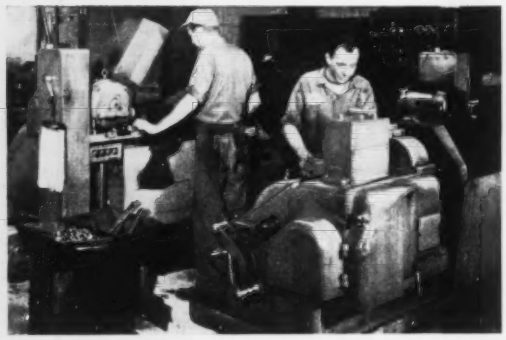
Bidding . . .

- Defense favors advertising for bids to negotiated contracts.
- Small firms are given preference on tie bids.
- Precise specifications, drawings, and other pertinent data are made available to all bidders.
- When a small firm bids low but is refused the contract on the basis of a pre-award survey, SBA can rule that the small firm must get the contract if it is competent.
- Special offices within government agencies which urge subcontracting to small firms are maintained by the Atomic Energy Commission, General Services Administration, and the International Cooperation Administration (as well as the Defense Department and the individual services).

Renegotiation . . .

- Up to $1-million worth of business may be done with the government in any one year without being subject to renegotiation proceedings.
- Losses sustained on renegotiation business may be carried forward two years.

Sources: The President's Cabinet Committee on Small Business and STEEL.



A New Business ?

HOW do you go about starting a new business? What is the most important element?

In the production field, it's choice of product, says George V. Woodling, Cleveland patent attorney, who founded Flodar Corp. in 1945 with $2500. Last year, it grossed $670,000.

"Superinvention"—Invent a product similar to one that is established and in demand, but design it to avoid patent infringement, says Mr. Woodling. He calls the technique "superinvention."

It is a bread-and-butter practice among patent attorneys who spend hours searching patents for clients. In the process, they become familiar with the trial and error results of other inventors. They learn to avoid pitfalls.

How It Works—It requires careful, imaginative study of patents with the idea of finding a bypath which can lead to a patentable idea based on an established device.

It requires the services of a patent expert who has some technical knowledge and business experience.

Checklist—"Invent a device which meets a long-felt need," says Mr. Woodling. "Choose something that is readily consumed or wears out quickly and you have an established market. Make your product small so that it can be mass-produced on existing machinery, but be sure it is better than existing devices. Make is quickly interchangeable with similar devices made by competitors."

Flodar Corp. produces hydraulic fittings. Mr. Woodling realized that higher hydraulic pressures being used in industry would create a "blue chip" demand for fittings that would not leak or break.

Barred by Patent—Existing patents so thoroughly covered the conventional soft metal sleeve in hydraulic fittings that Mr. Woodling turned to hard tempered, alloy spring steel, something that had never been tried. The new product offered increased holding power and reduced tube vibration under high pressure. From the start, it has been easy to sell.

Other Elements—Flodar was set up as a simple corporation under Ohio law with 250 shares at $10 each.

"A good attorney and a good accountant are vitally necessary to guide a new business through the maze of laws . . . to map growth . . . and advise on the plowing back of profits," Mr. Woodling says.

chain of command. In the large company, it may be a matter of days before the order clears all departments involved and reaches the production line. Time and money are lost.

Paperwork — A small company may operate on a single purchase order, while a large company may require many copies and separate instructions.

Quality Control — Because cancellation of a contract due to poor quality may seem a relatively greater loss to a small company than a large one, more attention is often paid to inspection procedures in the small shop.

Design Control—If it becomes necessary to alter design in the middle of a run, it is done easier in the small shop than the large because the work is easier to locate and less machinery is involved.

Summary

Precision Piece Parts Inc., Mishawaka, Ind., is a typical small business. Despite its mere 50 employees, the maker of screw machine products bids for defense work. Its standing in its community is measured by the fact that it has a waiting list for openings in both its skilled worker ranks and its apprentice program.

W. R. Nace, president, ascribes his company's performance and standing to:

1. Plant efficiency. (All equipment is replaced within ten years on a regular replacement schedule.)

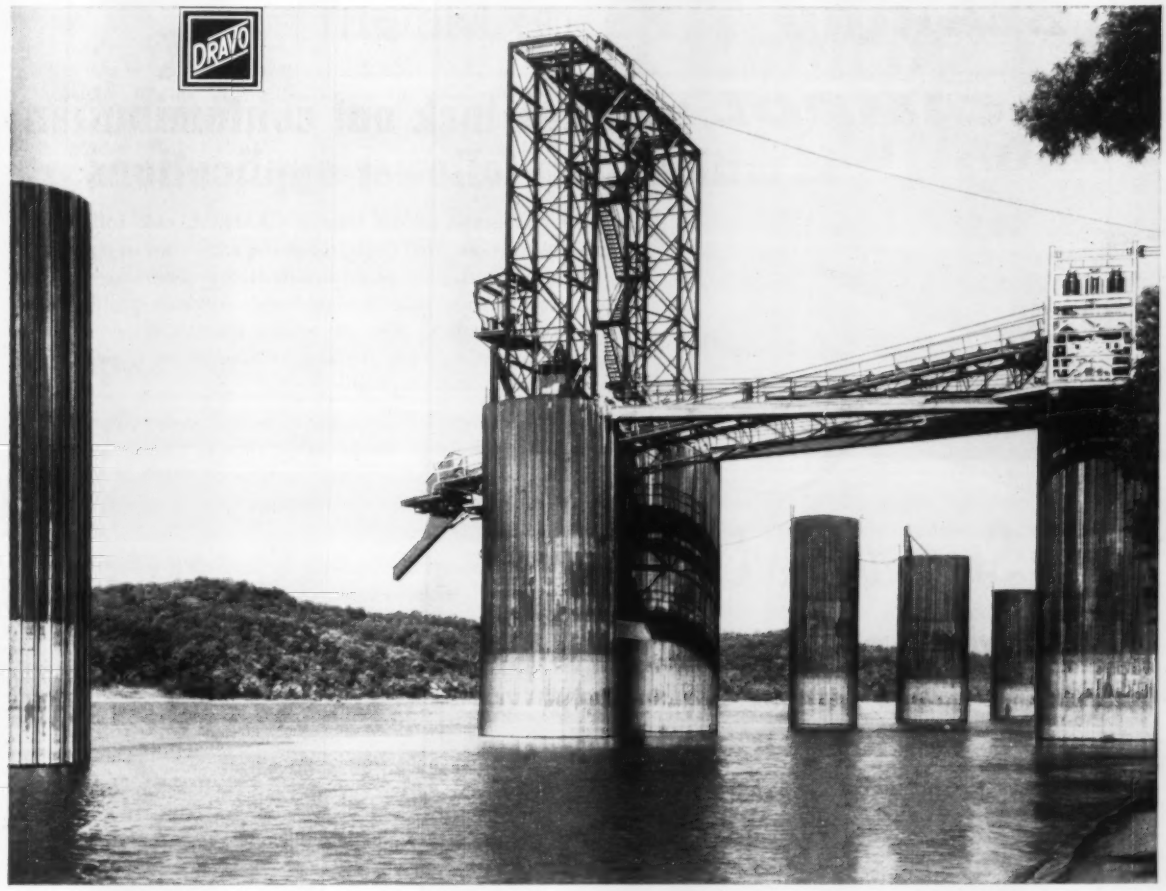
2. Specialty production. (60 per cent is defense work; emphasis is on tough jobs requiring alloys and stainless steel.)

3. The personal touch. (Precision never intends to grow beyond its present size.)

4. A profit sharing plant. (It keeps the work force efficient and interested in seeing that business is good and backlogs substantial.)

Last year 327,000 small businesses were discontinued. But 381,000 new ones were started.

Says Commerce Secretary Sinclair Weeks: "Small business comprises the overwhelming majority of establishments, opens limitless opportunities for individual initiative, and is the seed corn which aerates the economy. It is just as essential to our scheme of things in this country as growth is in any phase of life."



"MILLION TON" dock for new DeKoven Mine

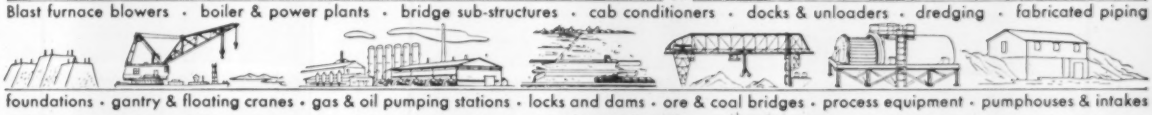
Pittsburgh & Midway Coal Mining Company can load more than a million tons of coal annually at this modern, cellular type barge dock near Sturgis, Kentucky, on the Ohio River. A two-mile long, 42 inch conveyor belt connects the facility with the company's new DeKoven mine.

Eleven cells, three of which support the loading mechanism, are spaced along 1175 feet of shoreline. Constructed of interlocking sheets of steel piling driven to rock, each cell is filled with sand and gravel and topped with concrete. Ruggedness, economy and minimum maintenance make this an ideal type of dock for most purposes.

In the past eight years, Dravo has installed more than 100 of these docks for firms in the chemical, steel, coal, utility, railroad, petroleum and other industries. For more information on this or any of the products and services shown below, write to DRAVO CORPORATION, PITTSBURGH 25, PENNSYLVANIA.

DRAVO
CORPORATION

Blast furnace blowers · boiler & power plants · bridge sub-structures · cab conditioners · docks & unloaders · dredging · fabricated piping

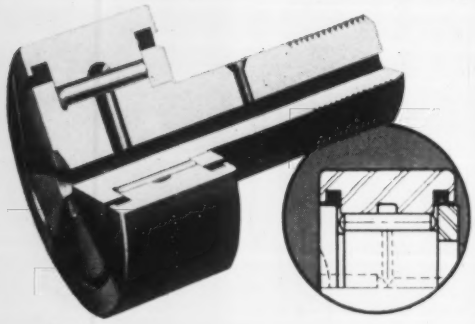


foundations · gantry & floating cranes · gas & oil pumping stations · locks and dams · ore & coal bridges · process equipment · pumphouses & intakes

river sand and gravel · sintering plants · slopes, shafts, tunnels · space heaters · steel grating · towboats, barges, river transportation

BEARING TIPS by McGill

sealed CAMROL® bearings lock out contamination in critical cam follower applications

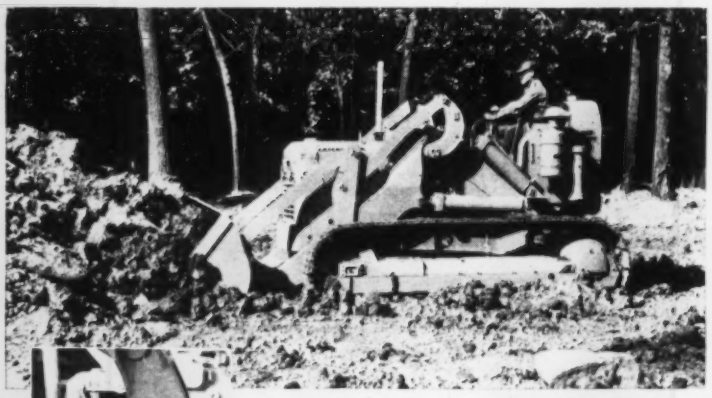


Now Sealed and Prelubricated

The new SCF series of the famous CAMROL cam follower completely seals out dirt, chips, moisture, etc. — an important advantage where the life of an ordinarily open mounted cam follower can be materially increased with adequate protection against contamination. Also the sealed bearing is pre-lubricated with provision made for easy re-lubrication, if desired, through either end of the stud.

Specially treated synthetic seals are contained in the outer race undercuts over the stud flange and roller retaining washer. For added protection, all external surfaces of the bearing are treated to provide a corrosion resistant, black ferrous oxide surface.

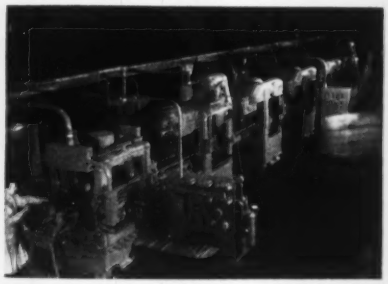
These same advantages are available in the SCYR sealed series Cam Yoke Roller (without stud). Specify CAMROL bearings with the built-in seals that preserve cam follower dependability in critical cam action, support or track roller application.



Built-in seals protect and preserve CAMROL® bearings from contamination in CATERPILLAR-built TRAXCAVATORS®

McGill SCF series sealed CAMROL bearings provide the cam action that positions the bucket of the No. 977 Traxcavator unit at the selected digging angle. Mounted on bell crank arms that are actuated by contact with a cam shoe on a hydraulic cylinder linkage, these bearings are operating in the open and exposed constantly to dust, dirt and moisture. External surfaces have a black ferrous-oxide finish to prevent corrosion. These sealed McGill cam followers eliminate the need for relubrication and maintenance after installation. Caterpillar uses other McGill bearings including twelve CYR series cam yoke roller bearings in the flywheel clutch.

378 sealed CAMROL® bearings guide engine blocks in INGERSOLL automatic milling machine



The sealed CAMROL bearings used in this machine, guide cylinder blocks during transfer through various milling, boring and drilling operations. The bearings, used in place of guide bars, eliminate surface scratching of the 200 to 300 pound blocks which are transferred at speeds up to 400 feet per minute. Blocks are processed at the rate of 95 per hour. Ingersoll reports freer movement, accuracy of positioning and materially longer bearing life due to the new design that seals metal chips out of the bearings.

Insure performance with McGILL®

MULTIROL® GUIDEROL® CAMROL®
Precision Needle Bearings

McGILL MANUFACTURING COMPANY, INC., 301 N. LAFAYETTE ST., VALPARAISO, INDIANA

STEEL
November 11, 1957

Technical Outlook

LONG-LIVED ROOFS— The Corhard Electrocast basic roof on Republic Steel's No. 22 open hearth (Cleveland) finally went down for rebuild after 555 heats and four shutdowns for repairs. C. W. Cravens, assistant district manager at Republic, told the Southern Ohio Section of the National Open Hearth Committee, AIME, that No. 22 will get a new Electrocast roof. Another was installed on No. 24 several weeks ago, and No. 15 is due for one in the middle of November. The breakeven point for the expensive roofs is about 356 heats without repair. A big incentive: 2 to 3 tons more production per hour (through higher firing rates).

FAST SCRAP CHARGING— Armco Steel Corp. revealed at the same meeting that it is giving the Calderon charging system a try at its Butler (Pa.) works. Scrap is brought onto the open hearth floor in a highside gondola and is transferred to a charging hopper by magnet. Under the hopper sit three charging pans (one to receive the charge; two for spillage). When a pan is full, a charging machine behind the hopper moves the pan directly forward into the furnace. The system eliminates the string of buggies which block one furnace when another is charging. It speeds up charging by at least 15 per cent.

PLASTIC TOOLS— A research report (available from American Society of Tool Engineers, Detroit) offers two methods of measuring shrinkage in plastics to be used for tools. The Purdue Research Foundation did the work under the auspices of the ASTE Research Fund.

NEW APPROACH— Small crystals which grow as delicate plates from the surface of stainless steel point up a way to study failures by stress corrosion cracking. They were described as "submicroscopic platelets of chromium oxide" by Dr. Earl A. Gulbransen, advisory chemist at Westinghouse Research Laboratories, Pittsburgh. (He was speaking before the Second World Metallurgical Congress in Chicago last week.) The crystals form on strongly stressed stainless steel specimens which are exposed to corroding atmospheres containing traces of chloride. In practice, stress corrosion cracking affects stainless parts which are in contact with corrosive systems while under an internal or applied stress. It can result in complete failure. Dr. Gulbransen reported that it can be triggered by such mildly corrosive substances as steam or perspiration on parts having only internal stresses left in them during their manufacture. Pipes, turbine blades—even coffee urns and cooking vessels—can fail in this manner.

GIANT HONE— Large cylinder liners made at Cooper Bessemer Corp.'s Grove City, Pa., plant now get their final touch of precision on a honing machine that's 33½ ft high. The machine will process parts with 36 in. holes, 96 in. long. It was designed at Cooper Bessemer.

GRAPHITE COATING— Horizons Inc., Cleveland, has developed a method of putting a wear resistant, refractory carbide coating on machined graphite parts. Dr. Morris A. Steinberg, head of Horizons' metallurgy department, predicts a broad range of uses for it—from nuclear reactors to diecasting machine inserts.

ORE IN THE L-D— A new L-D process plant at Gusstahlwerk Witten in the Ruhr operates almost without scrap. A typical charge in the converter consists of 29 tons of cupola hot metal and 1 ton of iron ore. The blowing cycle is 19 to 22 minutes, tap-to-tap about 40 minutes. Simplified material handling and freedom from tramp elements are the big advantages of making steel this way.

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Patterns mounted on metal plates and contoured dryers are used in the D process

Carbon and low alloy steel castings made in Dietert process shells have close tolerances and fine surfaces. It's a production operation at a Texas Foundry

D Molds Make Precise Steel Castings

BOTH CASTING users and foundries can profit from the Dietert process for shell molding. It is termed "a valuable tool for product development" by William K. Merkel, manager of the shell molding division, Kincaid-Osburn Electric Steel Foundry Co. Inc., San Antonio, Tex. (His paper on the process won an award in the Third Product Development Contest of the Steel Founders' Society of America.)

What It Is—Harry W. Dietert, chairman, Harry W. Dietert Co., Detroit, established the theory of the process. Conventional core-blowing machines are used. The mold is blown between the pattern and a contoured metal dryer or machined blow plate. The dryer

D Process Helps Casting User

1. Machining costs are reduced. Some tolerances can be obtained as cast. Machining, when required, is held to a minimum. Finish of forgings (as much as ¼ in.) converted to the D process has been reduced to 1/32 in.

2. Tolerances of 0.005 in. can be held on holes 1 in. in diameter. Over-all tolerances of 0.030 in. (0.015 in. to a side) can be held on castings weighing up to 12 lb.

3. Castings have a clean, satinlike finish when shipped.

4. Smoothness of D process molds allows full advantage to be taken of the fluidity of the molten metal. Sharp edges, thin metal sections, intricate shapes, and sharp detail can be cast easily. The engineer has great freedom of design in developing new cast parts.

5. There are no limitations on the material specifications that can be obtained.

D Process Helps Foundry

1. The average coreroom has the equipment needed to start production. A large outlay of cash for elaborate equipment that cannot be used for any other type of production is not required. A core oven with temperature control and a small hand muller meet the basic requirements. A coreblower without a mechanical draw cylinder can be used with a vibrating core drawing machine. Accurate draws are easily obtained by using a coreblower equipped with an automatic draw cylinder and vibrator.

2. The process is easily organized into a compact operation.

3. Mold surfaces are hard and do not rub off or erode from handling. Molds do not draw dampness and may be stored several weeks.

4. Customers are looking for precision steel castings with fine surfaces. The D process makes the casting self-selling.

forms the back of the mold and provides the support it needs in the green state.

A big advantage, particularly in steel foundries, is that any alloy can be used. There is no difference between the surface or the accuracy of an alloy or carbon steel casting. About 85 per cent of the castings made at Kincaid-Osburn are low alloy steels of the chrome-moly types. Some have about 0.30 per cent carbon, others about 0.40 per cent carbon. Another 10 per cent are in the low carbon category, and the balance are high alloy types.

Patterns used at Kincaid-Osburn are machined to tolerances of 0.001 to 0.005 in. and mounted on metal plates. The plates are vented and rigged for use on coreblowers with a mechanical draw cylinder. The coreblower operates on 80 to 100 psi of air pressure.

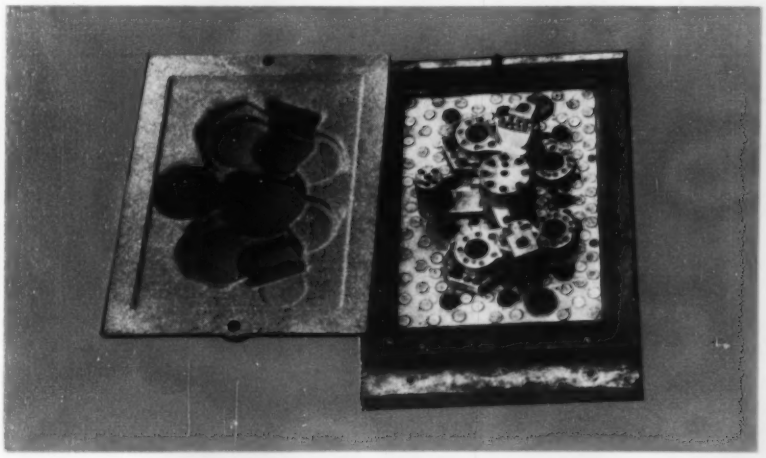
Sand Mixture—A four screen sand with an AFS fineness of 125 is used. Mr. Merkel says both round and subangular grain sands have produced excellent results.

An oleoresinous binder prepared for the process by Archer-Daniels-Midland Co., Cleveland, is mixed with the sand along with silica flour, fly ash, and iron oxide in an ordinary core sand muller.

D process molds have a green strength of about 0.5 psi. They develop a dry tensile strength of about 250 psi after proper curing. Molds at Kincaid-Osburn are baked 2 to 4½ hours at 425° F. The molds weigh up to 32 lb. The baking cycle is closely controlled to prevent mold warpage, cracking, and other forms of distortion.

Whether the molds are blown into contoured dryers or onto machined plates depends on the shape of the pattern and the venting properties which can be obtained. Machined plates should not be used if they cause the mold walls to be too thick for the proper venting of the gases formed in pouring.

Cores — Insert cores are made from the same material and handled in the same way as the molds. The insert cores can also be made with the CO_2 process. Kincaid-Osburn uses the same sand for its CO_2 cores as it uses for the D



Standard coreroom equipment is used to make precision molds

D MOLDS . . .

process. CO_2 cores are used when D process cores would be impossible to make without the use of dryers.

Assembled molds are bolted together if their size and shape permit. Some molds which are blown into contoured dryers cannot be so assembled. They are cradled in loose, heaped sand, and weights are placed on top to prevent the mold from opening at the parting line due to metal pressure.

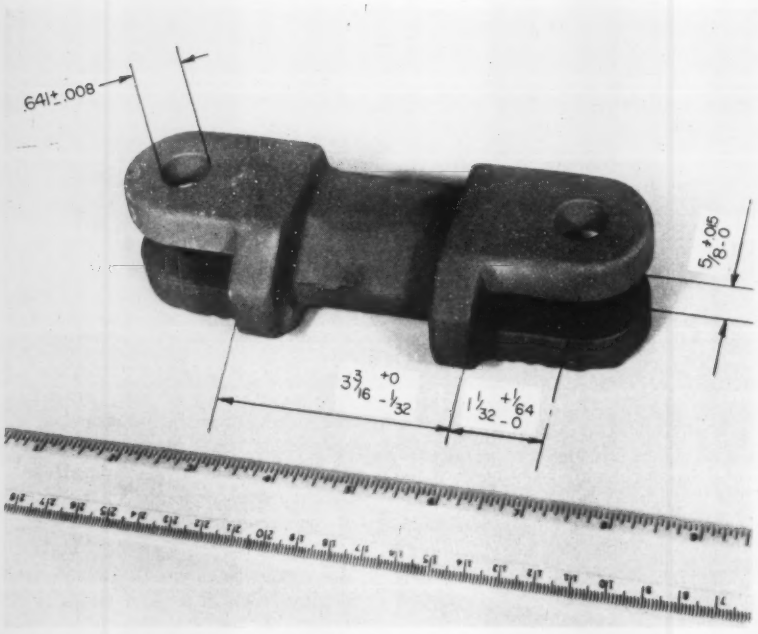
Gate cores and runner cups are made of ordinary core sand and coated with a core wash. No washes are used on D process molds or cores, and no pastes are used on the mold parting surfaces.

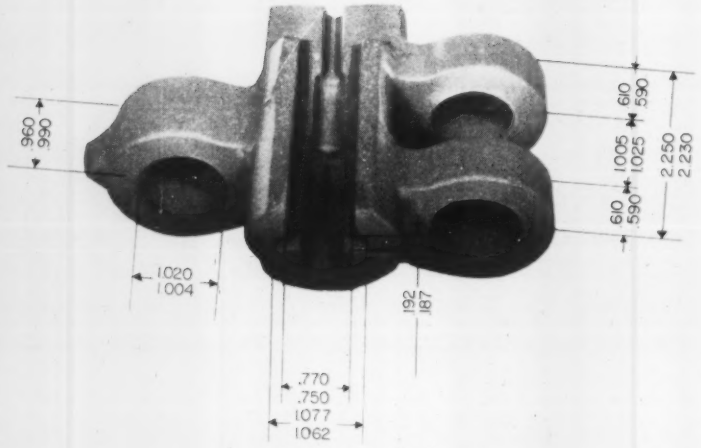
Casting Properties — The high permeability of the molds virtually eliminates presence of gas pockets in the casting and contributes to the fine casting surface which is obtained. Only in a few cores is a contoured shell required for good venting. Most molds can be blown on flat plates.

The possibility of hot tears is greatly reduced because the mold collapsibility can be regulated. The sand mixture can be adjusted so that the mold will collapse at the correct interval following solidification to minimize warpage and flaking off.

Special handling of D process castings is required during heat treatment to eliminate oxidation (because of the close tolerances.) It is necessary to take all precautions to prevent warpage.

Way to Benefits — Mr. Merkel says Kincaid-Osburn's progress in the use of the process is due largely to the co-operation of its customers. They have realized that many of their tolerances were based on the capabilities of their machining equipment rather than the need of the part. The realization sparked the conversion of many machined parts and forgings to unmachined D process castings.





All dimensions shown on the clevis and safety clamp link are held by the D process. Both parts are made of low alloy steel

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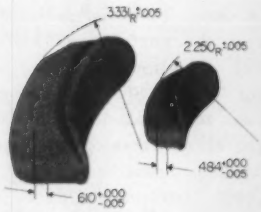
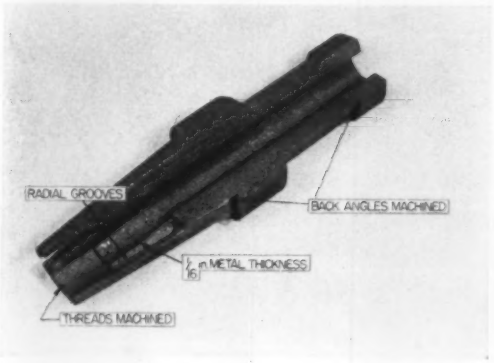
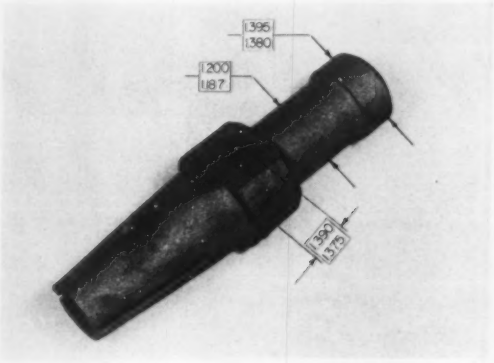


These casing scraper blades are made of a low alloy, chrome-moly steel with 0.40 per cent carbon. Parts were formerly made by another precision casting process. Costs were reduced about 75 per cent

A CASE HISTORY





THIS CASTING is part of a tool used in the petroleum industry. It must withstand severe abuse and is subject to high stresses.

When made from hot-rolled round stock, ten machining operations were required.

Specifications—The part weighs 1.75 lb. Its surfaces must be smooth enough to allow jaws to slide freely over the tapered section even under extreme loads. Parts must be held within 0.015 in., and a thin metal section is required.

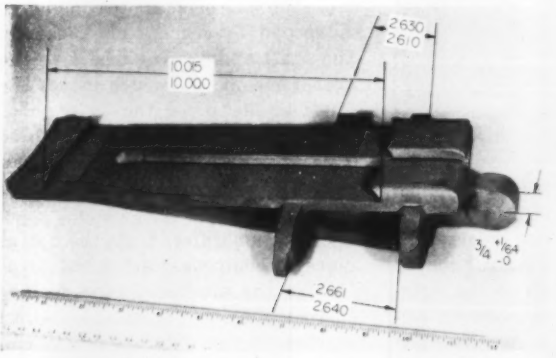
Smoothness of the radial grooves (see illustration) is essential to the operation of the part. The grooves were formed by boring with a 5/16-in. drill.

Conversion—Engineers of McMurray Oil Tool Specialties, Houston, and Kincaid-Osburn combined to convert this job to the D process. Labor was reduced 60 per cent, end cost 20 per cent.

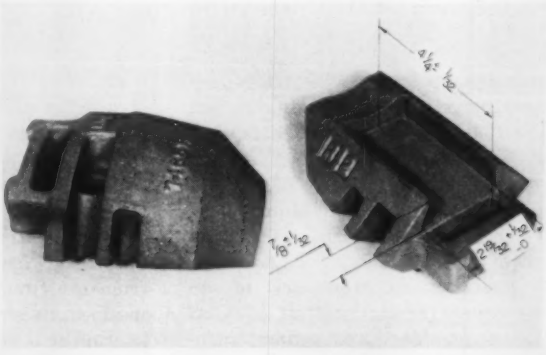
The core that forms the radial grooves was made by the CO_2 process. It met dimensional and surface requirements without the use of dryers.

The threads in the tapered end and the back angles were the only areas machined after conversion. The back angles were machined because casting them would greatly increase foundry and pattern costs, and machining was relatively inexpensive.

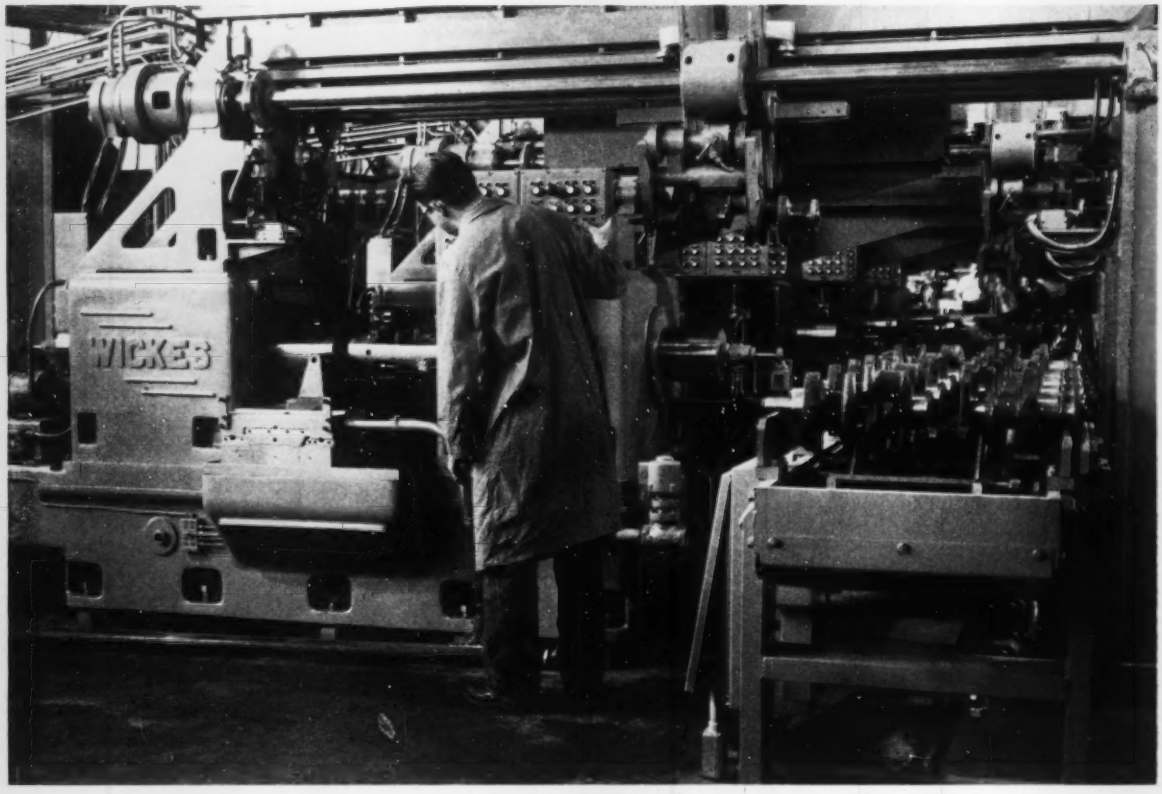
Strength requirements were met by a low alloy cast steel of the chrome-moly type (ASTM specification A148-55, Class 105-85). The casting is heat treated to a 35-40 Rockwell C hardness, oil quenched, and drawn. The part is subjected to a normal load on the back angle of the lower shoulder which creates a stress of about 12,000 psi.



The D process holds the tolerance required on the 10 in. dimensions. Setup and machining are eliminated



Expensive and time consuming machining of the dovetail on this part was eliminated by the D process



A rough forging moves across the transfer and into machining position on the first machine. After the first pin is finished, the part will be moved automatically through the other three lathes. Other parts wait at right

Crankshaft Line with a New Look

Four lathes, with 60-hp spindle drives, handle forged steel cranks, one pin at a time. Advantages cited include quick tool change and faster production with carbides

CARBIDES have been used only sparingly in machining forged steel automobile crankshafts, but a breakthrough may be in the works.

Example — Pontiac Motor Div., General Motors Corp., will go to them on a new line.

The system grew out of an eight-year research effort by Carl Bintz, president and general manager, Wickes Corp.'s Machine Tool Div., Saginaw, Mich. The line has four, single purpose lathes designed for carbides. They are tied together with an automated transfer and handling system. Each machine completes one of the four pin diameters on V-8 crankshafts.

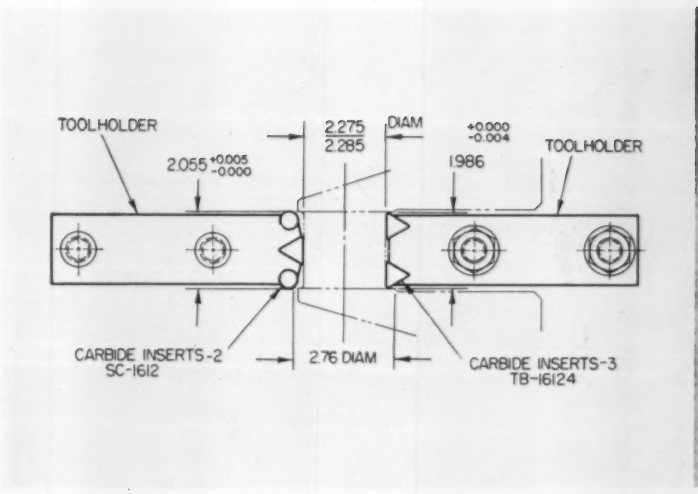
Flow — All machine cycles are automatic. Each crankshaft moves from the first section of the automatic conveyor into position opposite the first lathe. A cross slide picks it up and carries it about 5 ft, placing it in the open chucks.

The lathe automatically clamps the work and brings the cutting tools into action.

Less than a minute later, the No. 1 pin of the shaft is completed. A second overhead slide picks up the shaft and carries it back to the transfer conveyor which moves the shaft to the next lathe.

Movements to the next three machining stations are identical, except a different pin is machined in each. Also, the chucking in each station differs from the others since it compensates for the position of the pin being turned.

Tool Change Speeded — Every station of the automated line can be operated automatically, manually, or independently. Using



Special carbide cutters use standard inserts to slash tool change time. The drawing shows how the cutters work—triangular inserts for forming the pin diameter and round inserts for the interrupted cut on the cheeks

standard carbide insert tools, tool change time has been cut to a matter of minutes. When one lathe is shut down for change, the others continue to run—drawing parts from the supply on the transfer conveyor.

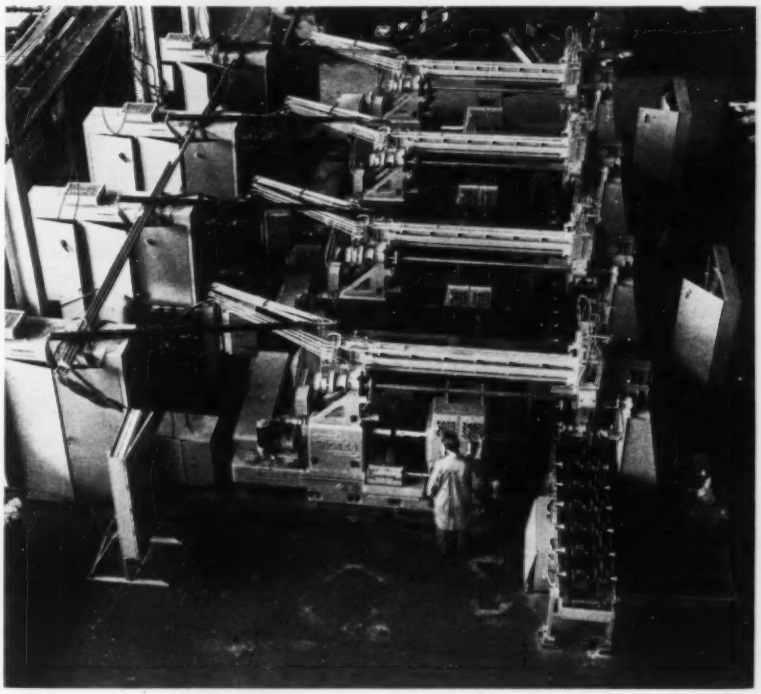
When the newly tooled machine is restarted, the first part from it jumps any gaps that may be on the line, so succeeding lathes won't have to idle while the work catches up.

Since retooling is simplified and machine operations are flexible, Mr. Bintz points out that there is nothing to prevent the line from being used to process crankshafts of several different engines.

Lathe Power—Each lathe has a double-end drive. Spindles are powered by 60 hp, variable speed, direct current motors. Cutting speeds have been boosted to over 250 sfpm. The lines can turn out 50 crankshafts an hour.

Cutters—The insert-type cutters, developed by engineers at Wesson Co., Detroit, approach the work from front and rear cross slides. Two circular tips in the front tool are used for facing the cheeks. A triangular cutter centered in the front holder aids two triangular inserts in the rear cutter for plunge forming the pin diameter.

Feed on the plunge forming is about 0.010 in. per revolution across the 2 in. width. Tools for cheeking, an interrupted cut, feed at roughly 0.040 to 0.060 in. each turn of the spindle.

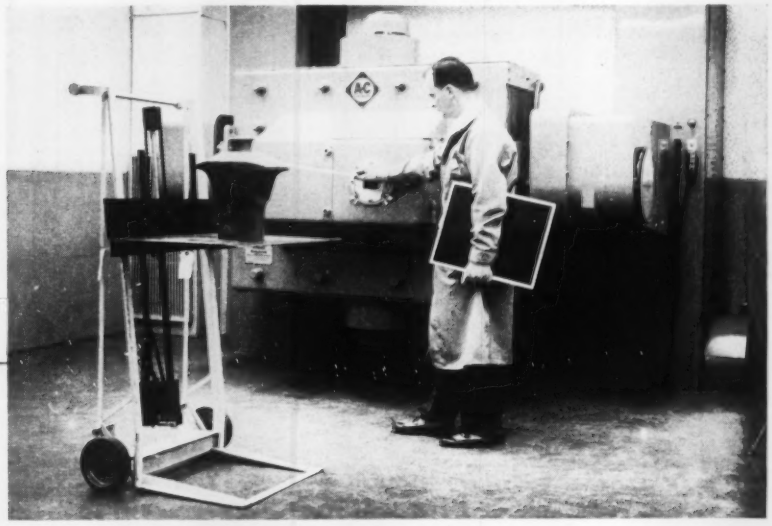


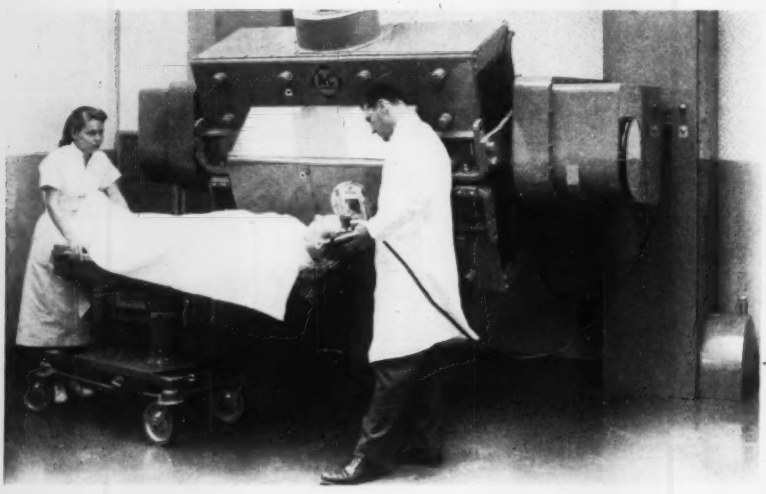
Over-all view of the line shows four machines, transfer line at right and machine control panels at far left. Individual control panels at the machines permit manual operation for setup and adjustment

Future?—Mr. Bintz predicts that the multiple machine technique, designed to do pins on the forged steel cranks, will also help crack the carbide barrier on the bearing diameter and on both pin and main line bearings of cast iron crankshafts. He foresees substantial economies on all jobs using this production technique.

Lab Checks Castings

by Night





Treats Patients

by Day

Industry Sends Work to Doctors

THE average small clinic can't afford a high voltage radiation facility for the treatment of cancer patients. But several enterprising medical men at Madison, Wis., have solved the problem by enlisting the support of local industry.

The doctors operating the clinic treat patients by day. Industrial work is checked by night. One day a week they solicit testing and inspecting business from foundries and research laboratories.

They point out that their 24-million volt betatron (Allis-Chalmers) is well suited for its dual role —although an industrial betatron can't be used to treat patients.

Setup — The building has two floors. The betatron, a cobalt room, and a 275,000-volt source are on the first. The betatron can penetrate 10 in. of steel in less than 5 minutes.

Schedule—By day, medical patients go to the second floor which includes offices, examining rooms, and a laboratory. The medical entrance to the betatron and radiation rooms is separated from the industrial entrance.

At 7 p.m., an industrial radiography staff takes over. Medical collimators are removed (they concentrate the betatron beam for narrow radiation), and material handling equipment takes its place.

Shipments of castings are stored in a 6 by 40 ft corridor adjacent to the betatron room.

Thin section work, which needs low voltage sources, is handled in the room which contains the 275,000-volt source. It also opens into the storage corridor. Eventually, the cobalt room will be used for industrial work when the betatron time is filled up.

A Thought — Companies with a need for high voltage radiography might do well to consider the merits offered by this example of medical-industrial co-operation.

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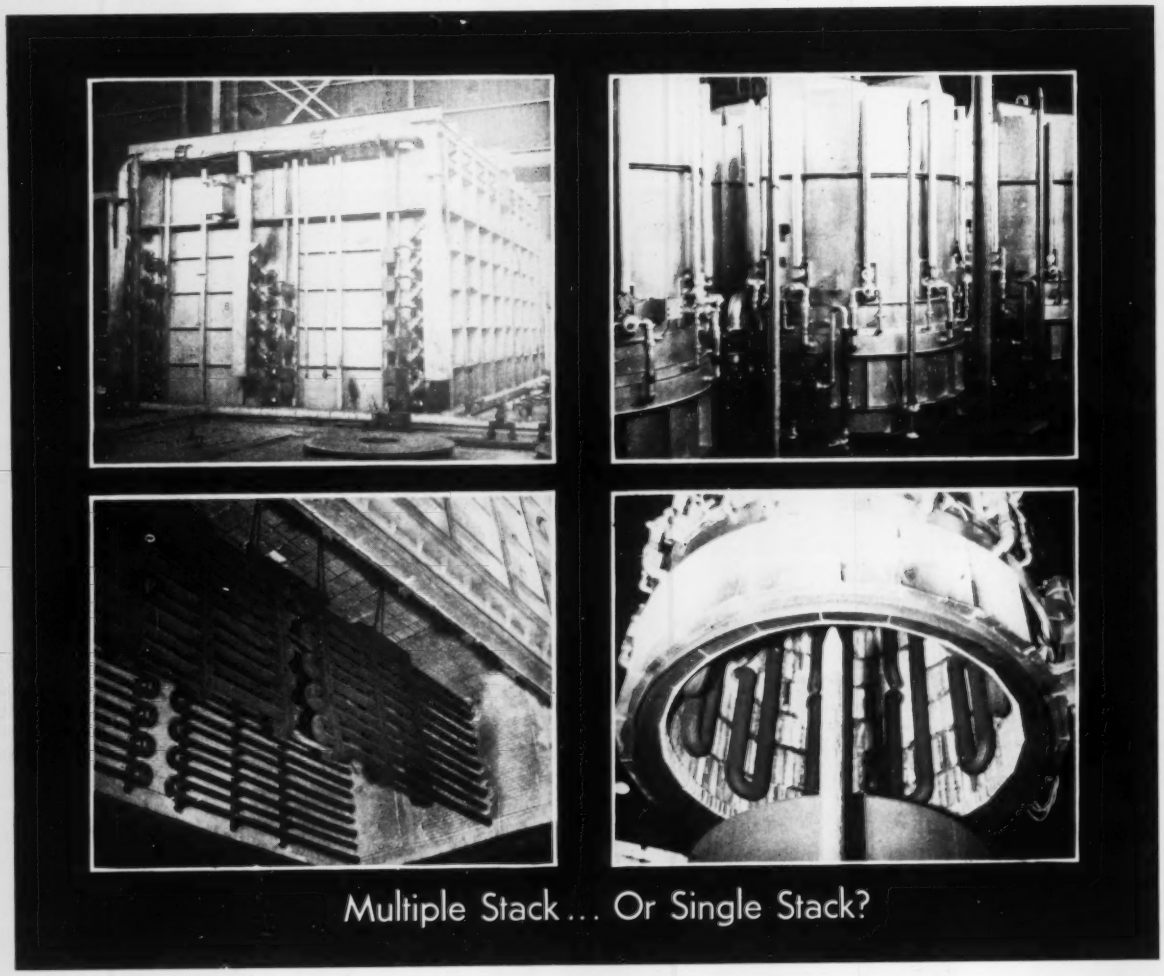

Single Stack Annealing Gets the Nod

At Republic Steel's plant in Cleveland, single stack and multiple stack furnaces are used to anneal the same type of coil products. Results favor the single stack

By HOWARD E. MILLER
Assistant Chief Metallurgist
Republic Steel Corp.
Cleveland

TODAY'S mill buyer of cold-rolled steel wants coils instead of cut sheets, better drawing quality, finer surface, and prompt delivery. Annealing practice has been a limiting factor in meeting his demands. It has taken big improvements in annealing to keep pace.

Two approaches have been used to increase annealing production.

The first: Larger furnaces which process greater tonnages during one cycle. The idea has been used in the multiple stack furnace. With eight stacks, you can build a 325-ton charge.

The second approach: A small charge with a fast furnace time. The single stack coil furnace can handle charges of 60 to 90 tons.

One Approach—Multiple stack

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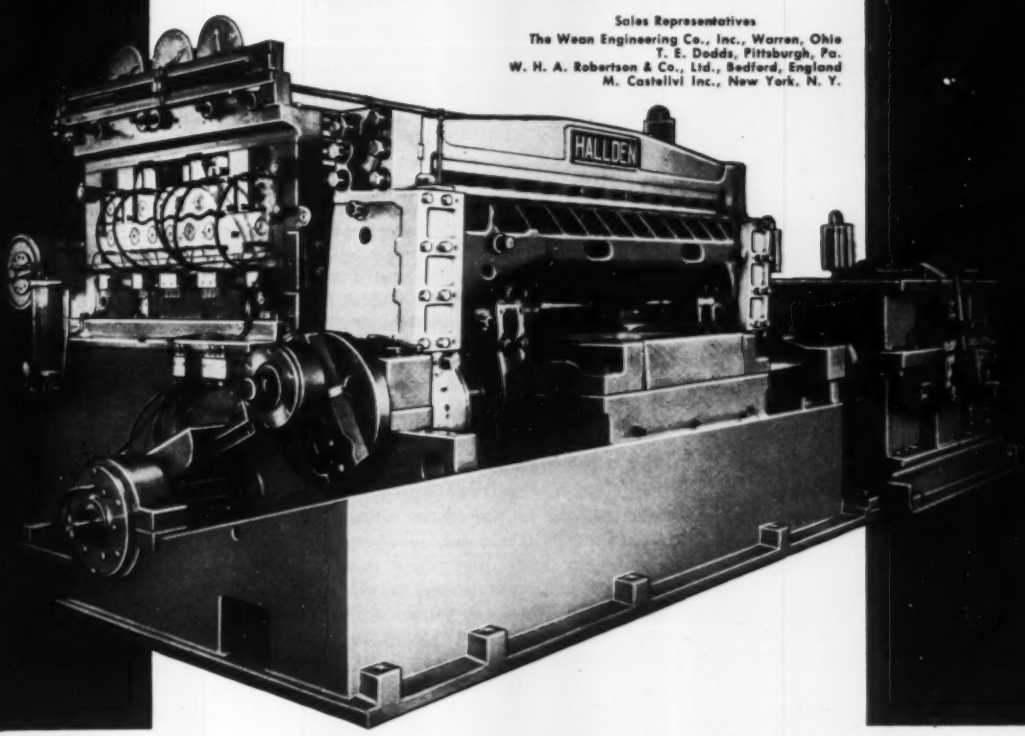

Spotlight on Annealing

Excerpts from an international symposium on Annealing of Low Carbon Steel, sponsored by Case Institute of Technology and Lee Wilson Engineering Co. Inc. at Cleveland—Oct. 29-30

ANNEALING CYCLES

A satisfactory product must be furnished the customer. First consideration must be given to the time and temperature necessary to relieve cold working strain. This is the minimum necessary for an annealed product.

Annealing of cold-rolled sheets below 1150° F is hazardous, especially with short soaking times. This temperature appears to be borderline for cold working strain relief and does not produce sufficient grain growth.

Relief of cold working strain appears to be almost instantaneous, and, evidently, the higher the temperature, the more suddenly relief occurs.

Effect of temperature on grain growth is almost a straight line function from 1150 to 1340° F (considering the same soaking time). Soaking time is important only as it affects grain growth.

Annealing Cycles for Commercial and Drawing Quality Rimmed Steels—Howard E. Miller, assistant chief metallurgist, Republic Steel Corp., Cleveland

ECONOMICS

Fabricators of cold reduced, flat rolled steel products have steadily raised quality standards. Stamping plants have been asking for better surface finish, and some have gone from sheets to coils for ease in handling and reduction of scrap. Mills have been forced to produce steel with more "rubber" in it to keep abreast of modern product designs.

Some customers still believe that all a mill has to do to produce flat-rolled sheets or coils in drawing quality is to anneal a little longer—and charge extra. Every producer knows there is more to it than that. Steelmaking must be controlled from the start. Drawing quality is influenced by the amount and type of scrap charges. Skilled annealing techniques are wasted if the cold-reduced steel comes into the annealing department with defects annealing cannot overcome—segregation, pipe, excessive grain growth, hot and cold mill ridges, and scratches that will cause stickers.

Today, a commercial quality sheet must take a light draw. Competition has forced many companies to put 10 per cent of their commercial quality tonnage through a drawing quality annealing cycle.

Styles in industrial design have led fabricators into deeper and deeper draws. An example is the wrap-around bumper. One manufacturer requires a steel held to 30,000-33,000 psi and elongation must be 38 per cent before failure. Fabricating this bumper involves complex bends up to 120 degrees. In addition, the steel must be free of surface defects, even stretcher strain marks, because of its bright chrome finish.

Fabricators want larger coils to help them cut scrap losses. The fact that can companies are beginning to do their own shearing from coils is forcing mills to make expensive changes in physical layouts of their electrolytic tin departments.

Mills reject sheets for imperfections that a customer might be glad to put up with when the market is tight. This creates a larger tonnage of secondary products, which has an adverse effect on mill profits.

Economics of Annealing in the U. S.—
Lyle F. Gulley, vice president in charge of operations, Granite City Steel Co., Granite City, Ill.

AGING

Boron, which is readily soluble in Fe_3C may promote the solubility of nitrogen. Perhaps here is the basis for the development of entirely new annealing cycles which can be used to produce higher quality deep-drawing steels. Controlled precipitation (quench aging) is probably one of the most important keys to development of steels which do not exhibit strain aging.

The discovery that the return of the yield point due to strain aging can be masked by residual stresses introduced during temper rolling may be the other valuable key to the problem of aging. It should be possible by careful control of the temper mill to introduce

ANNEALING . . . furnaces at Republic Steel Corp.'s 98-in. strip mill in Cleveland have three rows of horizontal radiant heating tubes at each end. They are parallel to the length of the furnace. The two outside rows have six tubes each, and the center row has five tubes. So each furnace has 34 tubes, or 17 tubes on each end.

The tubes are evenly spaced from the bottom of the furnace to about two-thirds the height of the charge area. (The ability to heat a charge depends on the amount of heat which can be concentrated close to its bottom.) The heat input of the eight stacks is about 18 million Btu per hour, or about 2.25 million Btu per stack.

Bases — Designed for ease of maintenance, the high convection type bases are 72 in. in diameter. They are equipped with 15-hp fans mounted under the center of the base which are capable of delivering 8000 cu ft per minute at 8-in. static pressure. The coils are separated in the charge by convection plates which make it easier for heat to penetrate from the edges as well as the perimeter.

a specified minimum residual stress. If this minimum is greater than the potential increase in flow stress due to strain aging, then the material will be nonaging in service. At the same time, strain aging restricted by annealing practice may eliminate other deleterious effects of aging—increased hardness and reduced ductility.

Quench Aging, Strain Aging, Yield and Flow Phenomena—
Eric R. Morgan, assistant director of research,
Jones & Laughlin Steel Corp., Pittsburgh

BRITISH PRACTICE

Stickers can arise from three sources: Reel tension, furnace temperatures, and surface finish of the reducing rolls. Optimum surface finish on the last stand rolls is 50 microinches, achieved through shotblasting.

The Abbey Works uses byproduct nitrogen from its oxygen plant for annealing in a 95.5 N, 3.5 H atmosphere. Its multiple stack furnaces are fired by open flame. Gases exhaust to a stack in which a valve provides back pressure to maintain furnace atmosphere at zero pressure. Inner covers are made of 25 Cr, 12 Ni alloy. They have been in use for five years and look good for another five.

Is it too imaginative to predict that in the not too distant future we will be using small atomic reactors to heat our annealing gases? We must realize that the continuous annealing line is a mixed blessing. Because it produces a stiffer strip, the customer can use a thinner product, which with optimum reduction on the cold mill means a thinner band required from the hot mill, and that in turn means a smaller hot mill yield. When we are striving to increase yields, such a turn poses problems.

Annealing of Cold-Reduced Sheets and Coils in Europe—
Harry H. Ascough, mills superintendent,
Steel Co. of Wales Ltd., Port Talbot, Wales

MILL PRACTICE

The microstructure of low carbon, hot rolled strip can be varied by proper selection of coiling and finishing temperatures. A uniform equiaxed grain structure may be obtained by doing all hot rolling while the steel is in the austenite condition. An abnormal grain structure, either coarse or deformed, may result when the finishing temperature is below the upper critical limit. The coarse grain structure results when the coiling temperature is above 1300°F; the deformed grain structure results when the temperature is well below 1300° F. A high coiling temperature leads to the formation of large, irregular cementite particles and a low coiling temperature tends to produce finer, more uniformly dispersed cementite particles.

Scale is removed from hot-rolled strip by acid attacking the decomposed ferrous phase. The outer layers of Fe_2O_3 and Fe_3O_4, which are only slightly soluble in acid, fall off once the underlying ferrous phase is dissolved. The rate of dissolution of the ferrous phase depends on the size and number of iron particles, which in turn depend on the rate at which the scale is cooled from above the eutectoid temperature down to room temperature. The iron particles which may be formed in the ferrous phase by proper cooling will be oxidized to magnetite or even ferric oxide if the scale is allowed to cool in the presence of air. This will reduce the ferrous phase pickling rate.

Effect of Hot Working and Cleaning Factors on the
Final Characteristics of Annealed, Cold-Rolled Steel—
Ralph D. Hindson, assistant chief metallurgist,
Steel Co. of Canada Ltd., Hamilton, Ont.

PREPARED ATMOSPHERES

By far the largest percentage of coiled strip is still annealed in deoxidizing atmosphere. However, desire on the part of the producers for a superior product, and demand of the trade for better quality prompted the need for an annealing atmosphere that would eliminate or alleviate the effect of prepared gases on steel surface finishes.

The best prepared atmosphere would be a dry H_2N_2 mixture. Hydrogen-nitrogen atmosphere produces a bright plate, low in pickle lag and reasonably satisfactory in edge-center-edge corrosion resistance.

Generation and Use of Prepared Atmospheres in the
Annealing of Low Carbon Steel Strip—
George J. Campbell, assistant fuel engineer,
Bethlehem Steel Co., Sparrows Point, Md.

HARDNESS

Manipulating process variables produces only slight hardness changes in continuously annealed black plate and tin plate. Increasing annealing temperature from 1200 to 1300° F, increasing cooling time in the 950 to 700° F range from 10 to 45 seconds, and decreasing temper mill extension from 1 to 0.5 per cent caused only slight softening.

Studies of various carbon (0.10 to 0.20), manganese (0.47 to 0.80), and nitrogen (0.002 to 0.010) contents showed that nitrogen had by far the greatest effect in increasing the strength and hardness of continuously annealed tin plate.

Effect of Variations in Annealing Cycle and Composition
on the Mechanical Properties of Continuously Annealed Tin Plate—
P. W. Marshall, assistant director,
Applied Research Laboratory, U. S. Steel Corp., Monroeville, Pa.

The normal furnace time for a full charge is 48 to 52 hours at about 1280° F (minimum). Furnace tube temperature is carried at between 1400 and 1425° F. On a drawing quality charge of coiled steel, the furnaces handle 5.8 to 6 average tons per hour for the total charge, or 0.72 to 0.75 tons per hour per stack.

Loading—It is difficult to consistently load the furnaces to best advantage. Bases should be loaded evenly, and coils should have an even wall thickness, to obtain maximum tons per hour and a product of consistent quality.

Having the required size and number of coils necessary for a charge is not always possible; in most the load varies from base to base, which presents a problem in heating. To obtain complete annealing, the furnace must be fired to the advantage of the heavier coils and the heavier charged bases, with a resulting loss of tons per hour.

Time Losses—The furnaces have an uneven heating rate within each coil as well as within each stack. Since a large percentage of heat transfer is by radiation, areas

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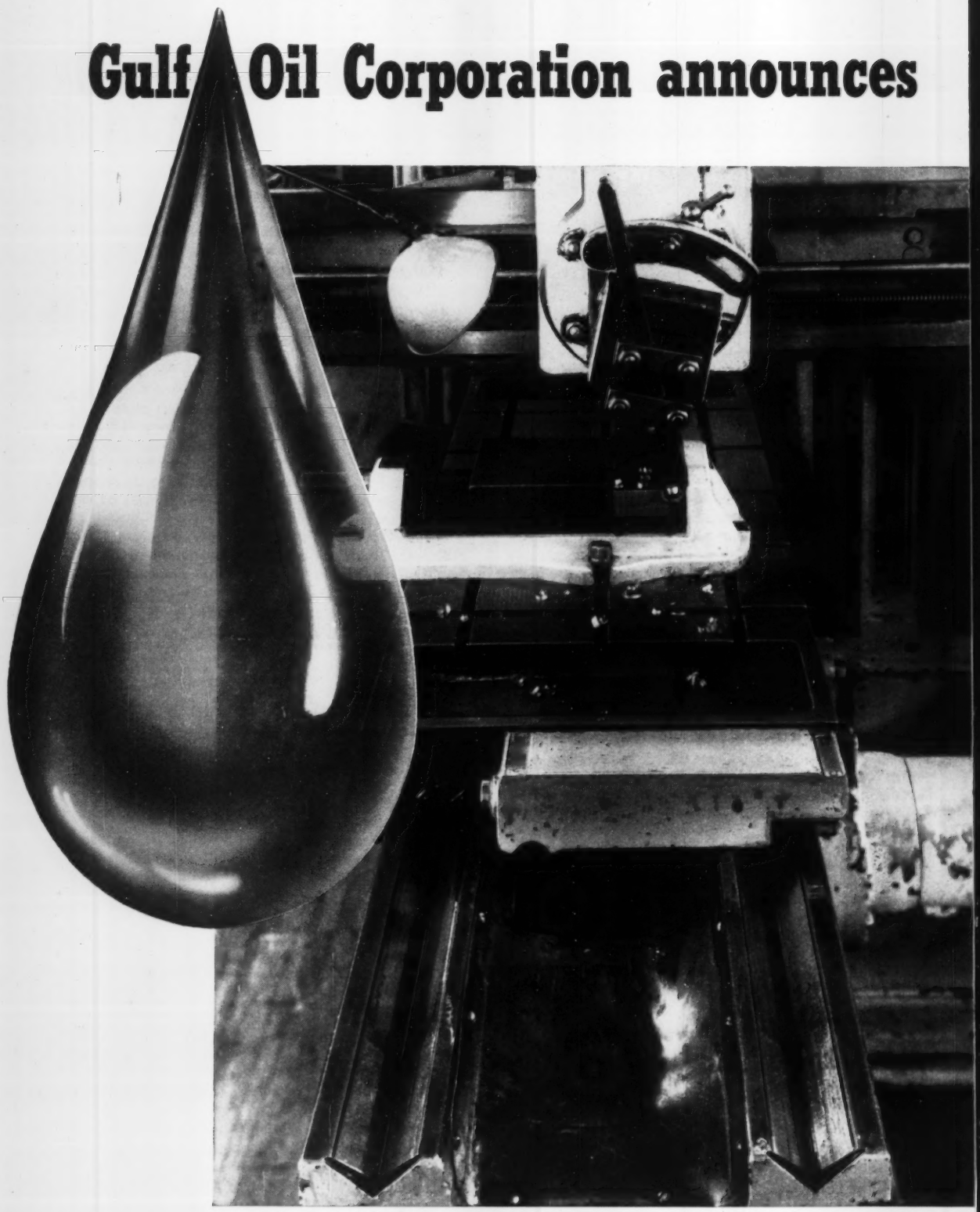

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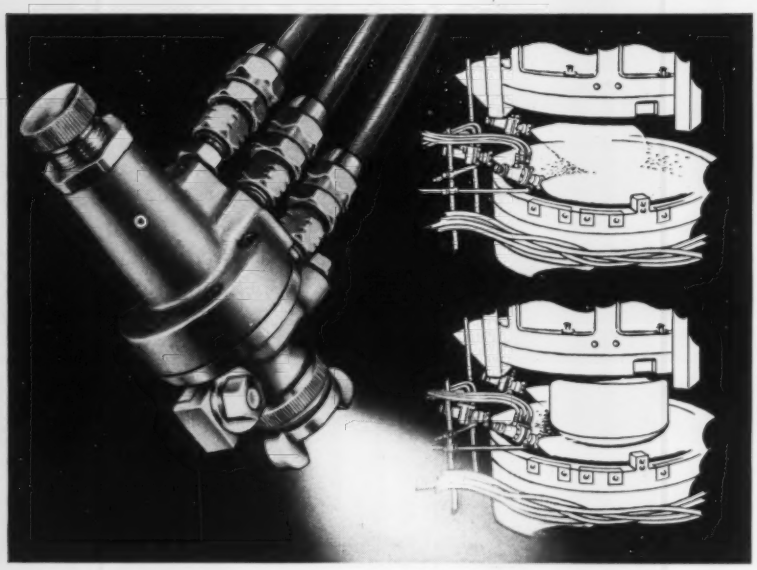

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ANNEALING . . .

farthest from the tubes have the slowest heating rate. To thoroughly anneal the entire product, it is necessary to lengthen the time cycle to compensate for the slowest rate.

The time necessary to cool the charge is also affected by the variation in base charge weight. Since the lightweight base will be thoroughly cold while the heavier charge will still be too hot to uncover, time is lost in delivering some of the product to the temper mills.

With today's close scheduling, such delays must be held to a minimum.

The combined effect of differences in coil sizes and the variation of heat transfer results in a range of Rockwell hardness and grain size in the material. Rockwell hardness will range from B-32 to B-48 in automotive drawing quality steels annealed at the best temperature and cycle. A longer cycle does not change the range to any great degree (it might drop the upper limit slightly). From a heating and quality standpoint, the furnaces are difficult to operate with close enough control to give a consistent product.

Other Approach — Republic's single stack furnaces are of the high convection, radiant tube type. Ten vertical tubes spaced evenly around the periphery of the furnace have a heat input of 5 million Btu. The tubes, extending about two-thirds of the height of the furnace, concentrate the heat at the bottom of the charge. The arrangement permits heat inputs and concentration that bring the charge to temperature faster than the multiple stack can. Increased productivity per furnace results.

The bases are a high convection, portable type designed for ease of maintenance. They are equipped with 15-hp fans capable of delivering 8000 cu ft of air per minute at 8 in. static pressure. Double wall inner covers are being used. The rapid, even circulation between the walls aids in shortening furnace time and increasing output per hour.

The Charge—In comparison with the multiple stack furnace, loading is simple. With a charge of only two or three coils, it is rela-

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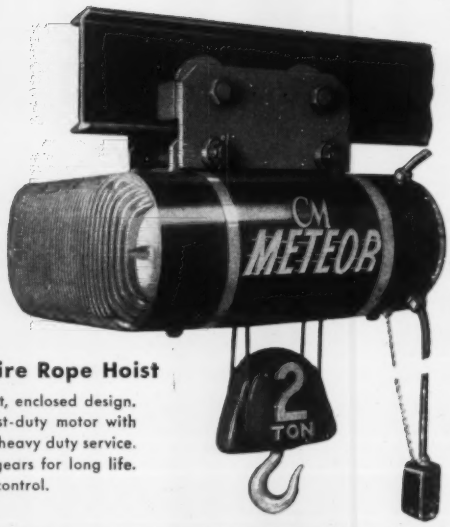

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CM HOISTS AND CHAIN

ANNEALING . . .

tively easy to select the coils for each charge.

It is easy to take advantage of a light charge for a fast heating rate; on heavy or full weight charges, compensation can be made in cycle time to assure a fully annealed product. The furnaces have a capacity of 30 to 40 tons, or an average of 1.1 tons per hour on deep drawing automotive body sheets.

Metallurgical Advantages — In comparing furnace performance, Republic has found that the single stack offers greater uniformity in hardness and grain structure. Since the ten tubes are evenly spaced around the furnace, fast, even heating is possible. The greater heat input, 5 million Btu per stack, affects the speed of the heat by convection and radiation, shortening the complete annealing cycle.

Soaking time need be only 8 to 12 hours to insure complete heating throughout the coil. The faster heating cycle has resulted in a cleaner product. The temperature range of 700 to 950° F is a critical one for carbon deposit and breakdown of the deoxidizing gas in the charge. The fast heating cycle helps to avoid carbon deposit because there is less time in the critical temperature range. The furnaces have less temperature lag from coil to coil in the charge. To some extent they avoid the breakdown of the gas.

Handling — Republic finds the single stack furnaces more maneuverable than the multiple stack in operation and maintenance. With the multiple stack, loss of one base or one furnace for repairs means the loss of eight stacks.

With the single stack, each stack can be treated as a separate charge, and the annealing temperature and cycle can be adjusted for best practice. The product is of more even quality than that from the multiple stack furnace.

With proper operation, good quality work can be done in either type furnace. Republic uses both. But factors of operation, maintenance, and quality favor the single stack.

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service,* STEEL, *Penton Bldg., Cleveland 13, Ohio.*

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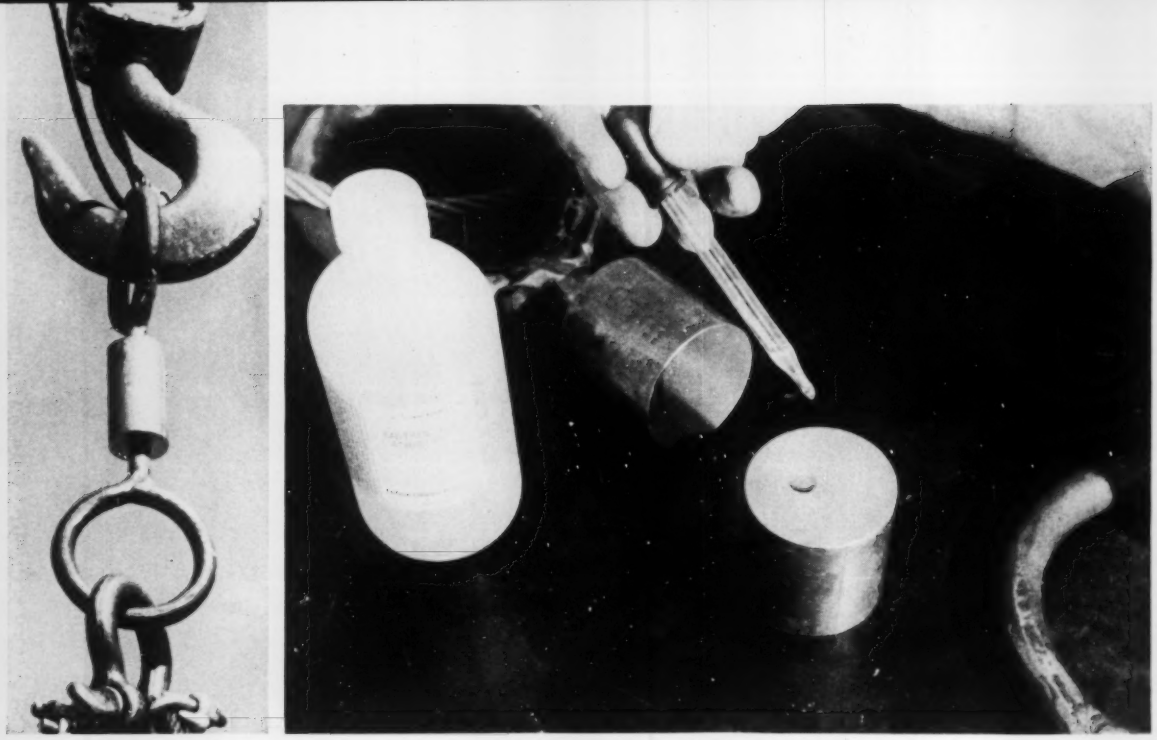

These 2-in. steel cylinders are threaded for eyebolts. A drop of Eastman 910 adhesive holds 200 lb in 5 minutes; in 48 hours, it holds 15,000 lb. Demonstration setup is at left

New Adhesive Holds 5000 psi

Joining assemblies with adhesives is said to be easier and faster with this material. This article describes the material and suggests some areas for its application

RESEARCHERS at Tennessee Eastman Co., Kingsport, Tenn., a division of Eastman Kodak Co., have come up with an adhesive which is said to be unusually strong, versatile, and quick-setting.

The photo above illustrates its properties: A single drop on a surface 2 in. in diameter holds 200 lb in 5 minutes, 5000 lb in 30 minutes, 15,000 lb in 48 hours. It requires no heat, pressure, or solvents. (Ultimate steel-to-steel tensile strength: About 5000 psi in 48 hours.)

Glass-to-glass bonds are unbreakable in 5 to 15 seconds, steel to steel in 20 seconds, wood to wood in 5 minutes.

Properties—Called Eastman 910 (a cyanoacrylate), the adhesive bonds unlike materials which don't respond to conventional cements, and firmly holds small joints such as those in miniature assemblies.

It works well on many plastics.

Preparation — Bonding surfaces must be thoroughly cleaned and dried. Only surface dirt needs to be removed. A toluene-acetone mixture is recommended for metal surfaces.

The adhesive is applied to one side of the joint. When a thin film covers the whole surface, the other half is pressed firmly in place.

Quantity—Eastman says that 1 lb will cover 100 sq ft on a smooth, nonporous surface. The adhesive sets within a few seconds after the parts have been pressed together. Most bonds are sufficiently cured within an hour to withstand rough handling.

Temperature—Short exposure to 212° F doesn't materially affect tensile strength; prolonged exposure breaks it down.

Eastman 910 resists solvents well. A 24-hour immersion in alcohol, benzene, or acetone doesn't affect it. Weak alkalies or acids cut tensile strength slightly.

Handling—The firm also points out that the adhesive reacts quickly with alkaline substances. It must be kept in closed containers. Shelf life is six months to one year.

It isn't harmful to skin although the dried film is hard to remove.

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A.W. Cold Rolled

Modern Electrolux® vacuum cleaners get a quality start—in just one of many aspects—in that body sections and rear covers are stamped from Alan Wood cold rolled sheet. The stamping demands are neither difficult nor easy, but because of careful study and testing, represent a happy mating of basic material and performance requirements.

The sheet, which had *its* beginning in scientifically chosen high-grade ores from Alan Wood mines, meets or betters Electrolux demands for gauge, finish, uniformity and performance—resulting in maximum production efficiency and minimum rejects because of material quality.

Alan Wood's initial demands upon itself for precise metallurgical study and quality control provide, we believe, a supplementary sales feature for Electrolux. This feature is a basic material of such consistent uniformity and high quality as to contribute reliability to the end product—a basic requirement for volume sales.

For detailed information on any Alan Wood product, write Marketing Division, Dept. CR-S70.

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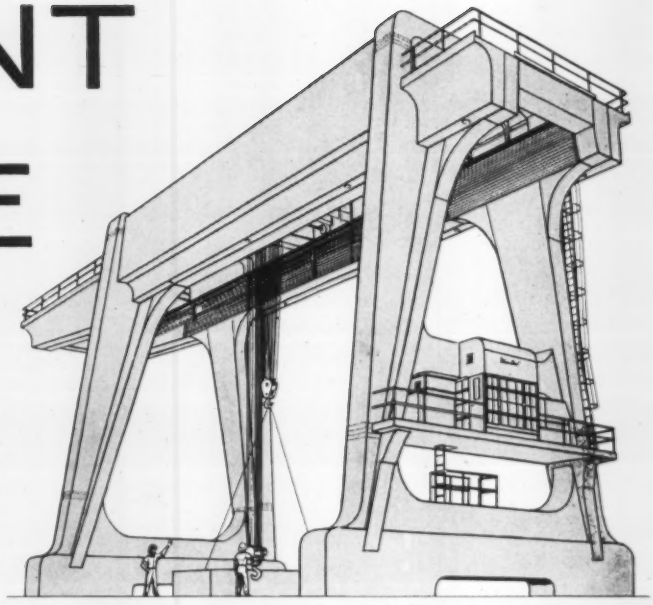
GIANT CRANE

FOR A GIANT'S JOB

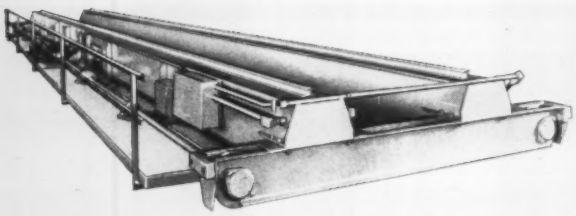


Built for a large hydro-electric power company, this giant gantry crane simplifies turbine overhaul and other equipment maintenance problems. It has a span of 70 feet. Total length is 122 feet and the height is 51½ feet. The two main hoists have a capacity of 80 tons each; the two auxiliary hoists 25 tons each. Twenty-three flat cars were required to transport the massive components to the site.

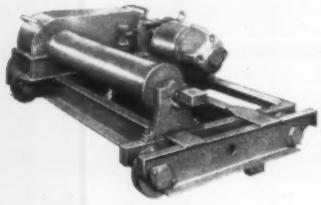
Shaw-Box know-how, experience and facilities have created and built all kinds of gantry and overhead traveling cranes in capacities to and beyond 400 tons. They are serving and saving all over the world—wherever only the best in crane service will do.

Many design and construction features first introduced by Shaw-Box are now accepted as standard by the industry. The Type "SC" Crane shown here is one of the latest Shaw-Box innovations in cranes of 5 to 20 tons for general industrial service. It combines the preferences of thousands of crane users. Advanced standardization and assembly techniques reduce the initial investment. The trolleys are standard units, but we have *pre-engineered* most variations for certain specific applications. Thus you can have a customized Type "SC" Trolley adapted to your needs without the high cost of a tailor-made design.

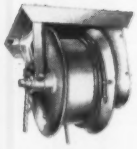
These widely different examples of Shaw-Box engineering typify the forward thinking that makes our cranes widely preferred by engineers and operators alike. Our engineers will gladly work with yours to assure you of the ultimate in crane performance, economy and safety. We invite your inquiry.



Typical Type "SC" Crane Bridge. Note the double web box section girders. No whipping or skewing even under the severest conditions. Direct drive bridge machinery has anti-friction bearings, gearing that operates in oil, and rotating wheel axles for smooth operation and longer life.



The Type "SC" Trolley has a higher hook lift than other unmodified standard top-running trolleys. It provides true vertical lift. The hoist mechanism is precision built for long, quiet operation and little maintenance. Two brakes hold and control the load safely.



"Shaw-Box" Cable Reel. A rugged, efficient mechanism that automatically keeps insulated conductor cable taut on crane and hoist magnets, on soaking pit carriages, mill machinery and machine tools. Spring cannot break.

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Photomicrograph of etched silicon-iron shows lined up cubic crystals. Their orientation provides good magnetic paths along the length and width of a sheet

Magnetic Steel Is Doubly Oriented

A major advance in materials, it can be easily magnetized in four directions. It means that large transformer laminations can be stamped in one piece instead of four

A NEW magnetic steel promises to improve the performance of electrical apparatus and simplify its construction.

Originated by scientists at the Vacuumschmelze of Hanau, Germany, and developed by Westinghouse Electric Corp., the material, called Cubex, is a "doubly or cube-oriented" silicon-iron. It is expected to be used in the magnetic cores of transformers, motors, and other electrical devices.

Distinctive Feature—The silicon-iron can be easily magnetized in four directions. Conventional magnetic steel is singly oriented. It can be easily magnetized in two directions only—along the direction in which the steel was rolled.

The atoms of iron form crystals in the shapes of cubes. The direction along any edge of the cube represents an easy path for magnetization; directions across any face of the cube, or through it, represent difficult paths. In Cubex steel, the cubic crystals are lined up, or oriented, providing good magnetic paths along the length and width of the sheet.

Due to Processing—The material has about the same composition as standard magnetic steel—3 per cent silicon and 97 per cent iron. The big difference is the way it is handled during its processing from the rough sheet to the final product.

Westinghouse scientists believe that the formation of cube orientation depends on a new mechanism of crystal growth and on carefully controlled structure during metallurgical processing. Under best conditions, test strips have approached 100 per cent orientation of the cubic crystals; the easy magnetization directions of the cubes were all within 20 degrees of the rolling direction or 90 degrees from it.

Still in Laboratory—A considerable amount of research and development still is required before the new material will be commercially available in useful sizes, says Westinghouse. Experiments have shown that the alloy can be made in thicknesses being used in 60-cycle electrical equipment, and small amounts of thicknesses useful for high frequency applications have been made.

Significance—The chief aim in building magnetic cores is to provide easy magnetic paths. In building rectangular cores for large transformers with singly oriented material, straight strips of metal laid at right angles in a rectangular shape must be used.

With doubly oriented silicon-iron, L, E, U-shaped, or rectangular stampings could be punched from a sheet of steel in one operation. This would simplify construction of the core, besides giving an improved magnetic path.

Cadmium Plating: How To Avoid Embrittlement

1. Maintain current density in cyanide bath at 60 asf, or higher. The plate is more porous; hydrogen will evolve during a relief bake.

2. Make a standard cyanide bath nonembrittling. An aircraft manufacturer has done this by adding nitrate ions to suppress hydrogen formation.

3. Try vacuum metallizing. There is no possibility that the steel can become charged with hydrogen. Corrosion resistance compares to that of electroplates.

Cadmium plates provide good protection for heat treatable, high strength steels like SAE 4340. Cyanide solutions are best to work from, but they often embrittle the parts

HYDROGEN embrittlement resulting from plating parts in cyanide cadmium baths can usually be relieved by a postplating bake. The problem is to assure satisfactory recovery every time. Another and better solution is to plate in a nonembrittling bath.

Lockheed Aircraft Corp., Burbank, Calif., has developed three techniques for reducing or eliminating hydrogen embrittlement. Reported at the SAE National Aeronautic Meeting in Los Angeles, they include: A controlled procedure for a standard cyanide bath, a modified nonembrittling cyanide bath, and vacuum metallizing.

Cyanide Baths—There is a direct relationship between the current density used in a cyanide bath and the residual embrittlement a part retains after a relief bake. In parts plated to a 1 mil thickness with current densities of 10 to 50 amperes per square foot (asf), residual embrittlement is more severe than when electroplating is done at 60 to 80 asf.

The best explanation: At higher current densities, the plate has lower density. Assuming that nonporous cadmium is a barrier against diffusion of hydrogen, and the porosity increases as density decreases, an embrittlement relief treatment (where absorbed hydrogen is evolved) is more effective when cadmium density is lower.

All high strength SAE 4340 steel, heat treated to 260,000 psi tensile strength or higher, must be plated at a current density above 60 asf at Lockheed.

Nonembrittling Baths—Cadmium fluoborate is nonembrittling, but it has poor throwing power. Postbaking of parts plated in cadmium fluoborate makes them brittle. Organic electrolyte baths also have limited throwing power and do not have the conductivity of aqueous baths.

Since the cyanide bath is superior in all respects except embrittlement, Lockheed research engineers set out to make it nonembrittling. They added nitrate ions to suppress hydrogen formation and a trace of an organic agent to maintain the throwing power and covering properties.

Results from Bath—Tests conducted for a year in a 200-gallon pilot plant tank indicate that the bath is not much more difficult to maintain than standard cadmium cyanide plating solution. Bend, reduction of area, and notch tensile tests indicate that SAE 4340 steel, heat treated to 260,000-280,000 psi tensile, can be plated in the modified cyanide bath without apparent embrittlement.

A new procedure for cleaning parts before plating has been developed. It yields stress rupture results equivalent to those of uncleaned parts. Procedure: 1. Fine vapor honing to remove scale and rust. 2. Anodic cleaning at 100 asf for 5 minutes in a commercial caustic cleaner, followed by water rinse. 3. Electrohoning at 100 asf for 15 minutes in a sulfuric-phosphoric acid bath, followed by water rinse.

The procedure reduces embrittlement to a minimum and is recommended for use with all types of ferrous metal plating where hydrogen embrittlement is a problem.

Metallizing—Another nonembrittling method tested by Lockheed for coating high strength steel parts with cadmium is vacuum metallizing. There is no possibility that the steel can become charged with hydrogen.

Parts are blasted with light grit (180 mesh or finer) before racking and placing in the vacuum chamber. The chamber is pumped to 0.5 micron pressure. A coating 0.0005 in. thick can be put on a part in 15 to 35 minutes, depending on the operator's skill in distributing crucibles in the chamber and regulating the rate of vaporization.

Adhesion—When the base metal is reasonably clean, adhesion is at least equivalent to that of electroplated specimens. Surfaces con-

Columbia Tool Steels for 1957-58
with A.I.S.I. Identification and Type Classification of Tool Steels

GRADE	Identifying Elements, In Per Cent										
	Type	C	Mn	Si	Cr	Ni	V	W	Mo	Co	Cb
COLD WORK TOOL STEELS — OIL HARDENING — TYPE SYMBOL O											
EXLDIE GM-02DIE	O1	.90	1.00	—	.50	—	—	.50	—	—	—
	O2	.90	1.60	—	—	—	—	—	—	—	—
	O7	1.00	—	—	.75	—	—	1.75	—	—	—
MEDIUM ALLOY AIR HARDENING — TYPE SYMBOL A											
E-Z-DIE SMOOTHCUT†	A2	1.00	—	—	5.00	—	—	—	1.00	—	—
	A4	1.00	2.00	—	1.00	—	—	—	1.00	—	—
	A5	1.00	3.00	—	1.00	—	—	—	1.00	—	—
	A6	.70	2.00	—	1.00	—	—	—	1.00	—	—
HIGH CARBON-HIGH CHROMIUM — TYPE SYMBOL D											
	D1	1.00	—	—	12.00	—	—	—	1.00	—	—
ATMODIE	D2	1.50	—	—	12.00	—	*	—	1.00	—	—
ATMODIE SMOOTHCUT	D2	1.50	—	—	12.00	—	*	—	1.00	—	—
SUPERDIE	D3	2.25	—	—	12.00	—	—	—	—	—	—
	D4	2.25	—	—	12.00	—	—	—	1.00	—	—
	D5	1.50	—	—	12.00	—	—	—	1.00	3.00	—
	D6	2.25	—	1.00	12.00	—	—	1.00	—	—	—
	D7	2.35	—	—	12.00	—	4.00	—	1.00	—	—

†With smooth cutting free machining additives

*Atmodie and Atmodie Smoothcut contain approx V.90%

Second of a Series of Six Charts Covering A.I.S.I. Tool Steel Type Classifications

COLUMBIA TOOL STEEL COMPANY • CHICAGO HEIGHTS, ILLINOIS

CENTRAL OFFICE AND WORKS, CHICAGO HEIGHTS, ILLINOIS — BRANCH STOCKS IN THE FOLLOWING CITIES:

Chicago 39, 4832 S. Kedzie Ave., Phone LAfayette 3-3632
Cincinnati 25, 2716 Spring Grove Ave., Phone MUlberry 1-8400
Cleveland 14, 1640 St. Clair Ave., Phone MAin 1-1785
Detroit 3, 121 Oakman Blvd., Phone TUlsa 3-3770
Los Angeles 22, 6955 E. Bandini Blvd., Phone RAymond 3-4684
Milwaukee 19, 5202 W. Lincoln Ave., Phone LIncoln 3-5200
St. Louis 13, 5118 Easton Ave., Phone FOrest 1-0641

REPRESENTATIVES IN THE FOLLOWING CITIES: Dayton, Erie, Grand Rapids, Hartford, Indianapolis, Louisville, Moline, Newark, Portland and St. Paul

TOOL COLUMBIA STEELS

COLUMBIA TOOL STEELS

HIGH SPEED STEELS: Clarite — Vanite — Carvite — Acmite — Cobite — Maxite — Molite — Molite Smoothcut — Molite #3 DIE STEELS: Oildie — Framdie HOT WORK STEELS: Clarite HW — Formite No. 3 — Formite No. 2 — Molite HW10 — Vanadium-Firedie — Alcodie — Firedie SHOCK RESISTING STEELS: Buster Alloy — CEC Smoothcut CARBON TOOL STEELS: Columbia Special — Vanadium Extra — Waterdie Extra — Columbia Extra — Columbia Extra Headerdie — Vanadium Standard — Waterdie Standard — Columbia Standard — Columbia Electrex

Automatic feeding and setting with...

T-J

Speeds up riveting and clinching!

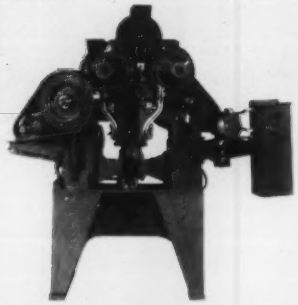
It's a quick step to *faster assembly* and *reduced labor costs* when you put T-J Rivitors and Clinchors in your production picture! These performance-proved machines are suited to a wide range of assembly jobs for aircraft, automotive, farm machinery, riviting jobs of all kinds.

T-J RIVITORS automatically feed and set solid rivets with high production. Electrically powered Rivitor sets solid steel rivets up to 7/8" long. Throat depths 8" to 36".

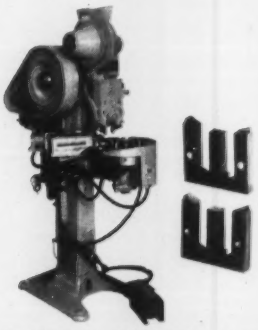
T-J CLINCHORS set clinch nuts with fully automatic operation, controlled by a single foot pedal. Available in Underfeed and Gravity feed models, throat depths 8" to 36".

Send today for these helpful references: Rivitor bulletins 646 and 555 . . . Clinchor bulletin 555. The Tomkins-Johnson Co., Jackson, Mich.

T-J
TOMKINS-JOHNSON
RIVITORS · AIR AND HYDRAULIC CYLINDERS · CUTTERS · CLINCHORS



RIVETS 4 AT A TIME! Special quadruple riveting unit, incorporating two Model "RR" Twin Rivitors, mounted on a special welded steel base. Equipped with air-operated hold down mechanism and a safety air trip arrangement. Tooled for riveting left hand and right hand automotive muffler bracket assemblies.



SPECIAL TWIN RIVITOR! Tooled for 6 station indexing fixture, incorporating automatic clamping and ejecting mechanisms, for riveting laminated armature assemblies.

T-J CLINCHOR adaptable to a wide range of clinch nut setting problems. Gravity feed model shown here.

CADMIUM PLATING . . .

taminated with dirt and oil can cause failure.

Coatings deposited on polished surfaces of 302 stainless, 2024 aluminum alloy, chromium plate, and low alloy steel showed poor adhesion. Results indicate that a purely mechanical bond is obtained with blasted surfaces.

Electroplated cadmium coatings normally can be blown or brushed off chromium plated areas of parts in production, but chromium plated areas of parts to be vacuum metallized must be masked; considerable effort is required to remove the cadmium from the chromium plate.

Coating Thickness—A uniform coating thickness is easily obtained by an experienced operator. The throwing power is better than it is in plating tanks and does not tend to build up as much on projections.

The vacuum deposited film is more porous than electroplated coatings.

Corrosion Resistance—Generally, vacuum deposited cadmium coatings offer corrosion protection comparable to that of electroplated coatings. Metallized films ordinarily develop a white efflorescence in salt spray tests, but no rusting occurs in the substrate.

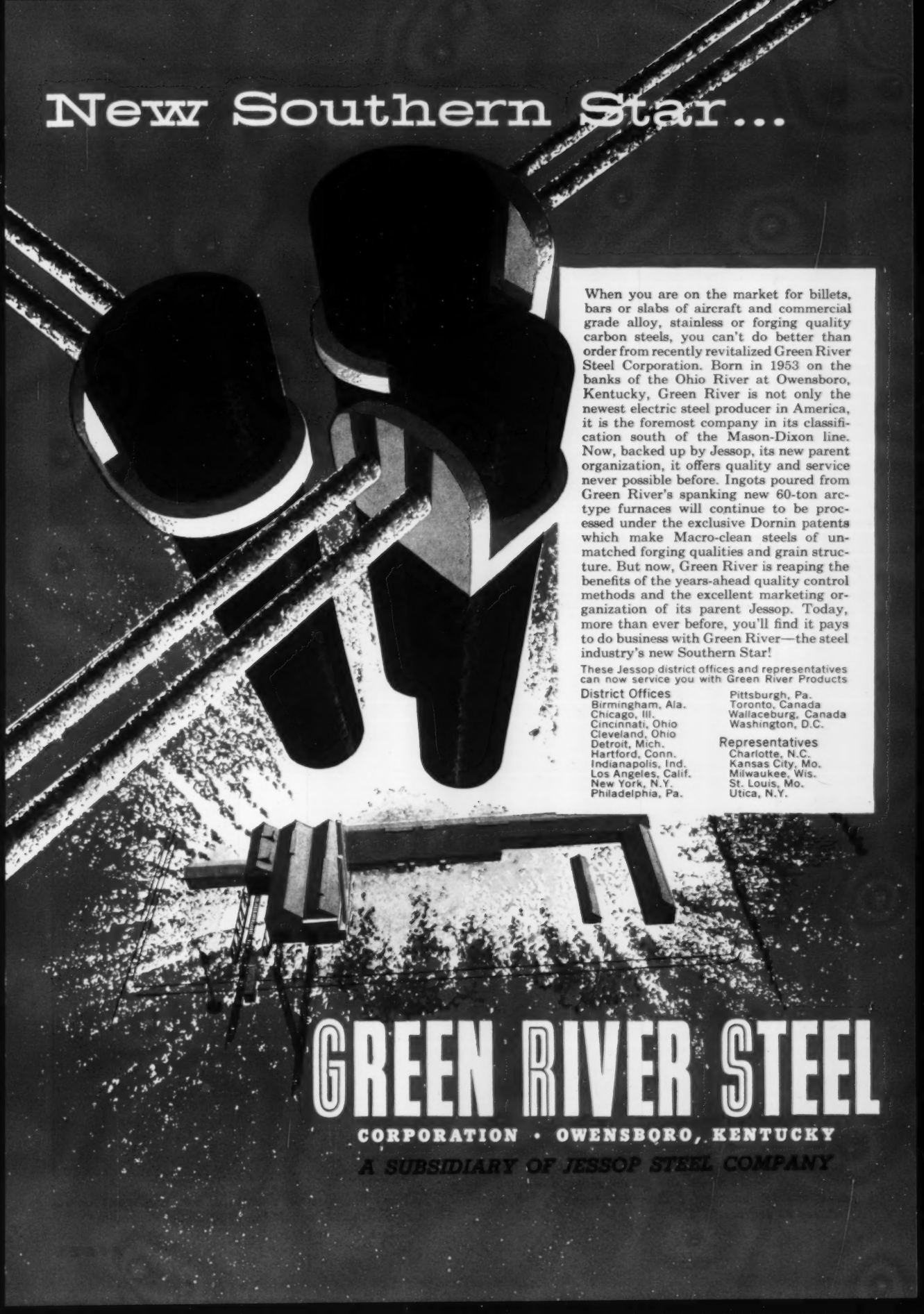
Many aircraft production parts processed by vacuum metallizing have been subjected to salt spray tests with uniformly satisfactory results. The variety of configurations used in the tests is considered to be a good cross section of the conditions encountered in manufacturing.

Postprocessing—Vacuum metallized films will accept chemical treatments and organic coatings in the same way and with the same benefits as electroplated films.

Heavy vacuum deposited cadmium films do not appear as bright as electroplated coatings. A dull matte finish (gray-white) is obtained. It's usually accompanied by a light superficial dust. Light buffing easily produces a bright finish but does not enhance the protective value of the coating.

Leaks in the vacuum chamber cause deposits which are dark to black, but salt spray tests indicate there is no loss in corrosion resistance.

New Southern Star...



When you are on the market for billets, bars or slabs of aircraft and commercial grade alloy, stainless or forging quality carbon steels, you can't do better than order from recently revitalized Green River Steel Corporation. Born in 1953 on the banks of the Ohio River at Owensboro, Kentucky, Green River is not only the newest electric steel producer in America, it is the foremost company in its classification south of the Mason-Dixon line. Now, backed up by Jessop, its new parent organization, it offers quality and service never possible before. Ingots poured from Green River's spanking new 60-ton arc-type furnaces will continue to be processed under the exclusive Dornin patents which make Macro-clean steels of unmatched forging qualities and grain structure. But now, Green River is reaping the benefits of the years-ahead quality control methods and the excellent marketing organization of its parent Jessop. Today, more than ever before, you'll find it pays to do business with Green River—the steel industry's new Southern Star!

These Jessop district offices and representatives can now service you with Green River Products

District Offices

Birmingham, Ala.
Chicago, Ill.
Cincinnati, Ohio
Cleveland, Ohio
Detroit, Mich.
Hartford, Conn.
Indianapolis, Ind.
Los Angeles, Calif.
New York, N.Y.
Philadelphia, Pa.
Pittsburgh, Pa.
Toronto, Canada
Wallaceburg, Canada
Washington, D.C.

Representatives

Charlotte, N.C.
Kansas City, Mo.
Milwaukee, Wis.
St. Louis, Mo.
Utica, N.Y.

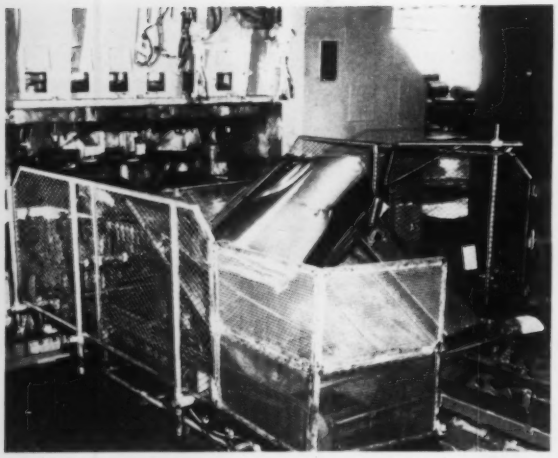
GREEN RIVER STEEL

CORPORATION • OWENSBORO, KENTUCKY

A SUBSIDIARY OF JESSOP STEEL COMPANY

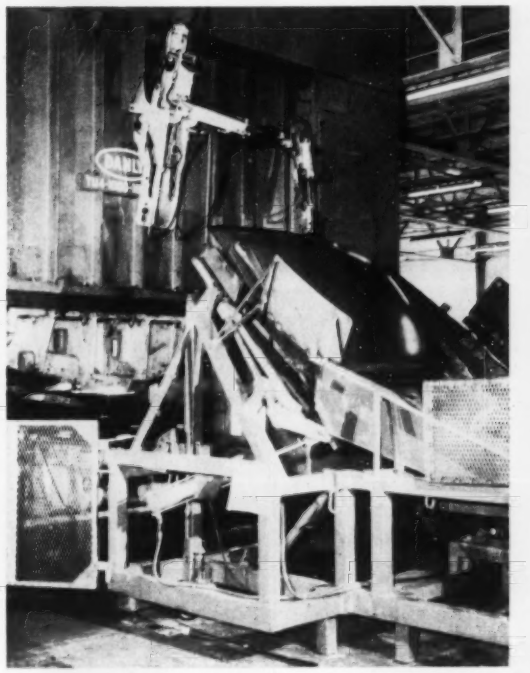
1. Operator feeds flat blanks to the first of three presses in the roof line. With the exception of this operation (loading), all work on this line can be done by one operator at a central control console

Chrysler Boosts Stamping Capacity

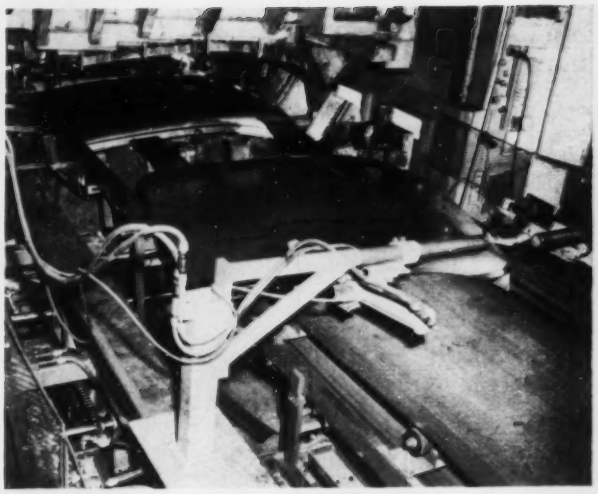


5. This turnover fixture on the quarter panel line catches the inverted panel from the Sahlin hand and rotates panel 180 degrees. As the panel slides down the incline, the far end hits a pipe that holds it. The panel indexes 90 degrees

6. These line dies do a series of trim and spank operations on quarter panels for 1958 model Plymouths



2. A Sahlin mechanical hand picks a roof panel from the first press, a draw operation, and flips it up and away from the dies. As the roof is swung up, this table rises to catch the inverted roof and start it down the line



3. Drawn panel loads into the trim dies as its trimmed predecessor is pulled onto a belt conveyor that takes it to the roof rack

4. Finished roof panels are loaded into waiting racks. Note rails on the floor that will guide loaded racks out of the work area

Already in partial production, this new plant will house 260 presses. It will turn out 300 different stampings for all the corporation's automotive lines

CHRYSLER management is betting heavily that its 1957 sales boom will continue.

As part of the wager, the corporation has put up an $85-million dollar stamping plant at Twinsburg, Ohio, that may eventually add as much as 40 per cent to the firm's stamping capacity.

Progress Report—About 65 per cent of the 1.7 million sq-ft building is in operation (22 of 28 major press lines are working). The balance is still under construction. When it's finished, some 3500 men will be processing 300 different kinds of body stampings.

Flow—All raw material is received on the east side of the building. Production flows in a straight line to shipping on the opposite side of the building.

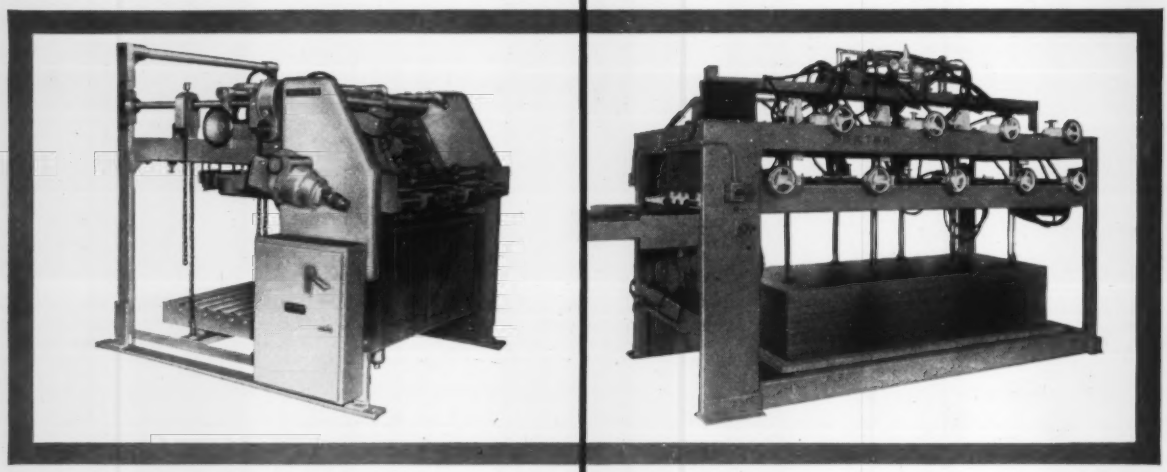
W. T. Hanlon, plant manager, expects all incoming material to be coils within a few years. In fact, the present stock preparation department could do the job. The department is next to receiving. Its slitters, shears, and blanking presses turn out press stock in the form of coiled strip, blanks, and sheets.

Twenty-eight presses (across from stock preparation) head up the major stamping lines. Karl Horvath, manufacturing manager, is particularly proud of the exit ends of the line. "One problem with stamping shops," he explains, "is that while many lines have a high degree of automation, product flow breaks down when it comes to getting finished pieces away from the line."

One solution to this problem in Twinsburg: Angle irons have been bolted to the floor to form tracks. As soon as a wheeled rack is loaded, a hydraulic cylinder will push it out of the way and bring in an empty one.

NEED HELP WITH

Sheet Handling Problems?



Dexter 9000# H.D. Feeder runs at speeds up to 9000 sheets of tin plate per hour. Used primarily in most major metal decorating plants.

Dexter Plate Feeder handles metal plates up to 3/16" thick and a maximum size of 4-by-12 feet. Used in many plants for feeding descaling equipment.

CHECK WITH DEXTER

Dexter's been designing and building sheet handling equipment for over 75 years...*sheet feeders* for metal decorating presses, scroll shears, punch presses, coaters, slitters...*pack turnovers* for speeding up two operation processes...*oven strippers* and *pilers*...*cardboard* and *corrugated board feeders* for presses and packaging lines ...*paper feeders* for printing presses, varnishers and folding machines. For almost any sheet feeding problem Dexter has the answer...with its wide range of equipment.

Dexter Feeders are available in over a hundred sizes, speeds and load capacities to suit individual machine or process requirements. Sheet sizes range from 14 x 14" to four by twelve feet...sheet thickness from .006" to 3/16" or more...load capacities from 6,000 to 30,000 pounds ...and speeds from 600 to 9000 per hour!

Thousands of Dexter sheet handling machines are in use today in container plants, electrical equipment factories, appliance manufacturing plants, in tin plating lines, printing and binding companies, and in a wide variety of other industries...speeding up production efficiently and economically.

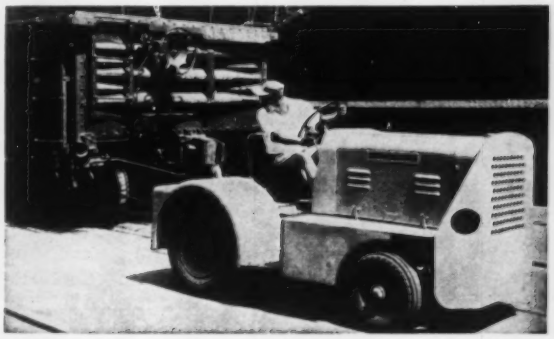
If you need help with your sheet feeding problems—check with Dexter. Their combination of engineering experience and equipment flexibility may be the solution for increasing your productivity.

Write or call for complete details.

DEXTER
FOLDER COMPANY
DIVISION OF MIEHLE-GOSS-DEXTER, INC.

General Offices: 219 East 44th Street, New York 17, New York

Towing Tractor Can Pull 100 Tons on Level Surfaces



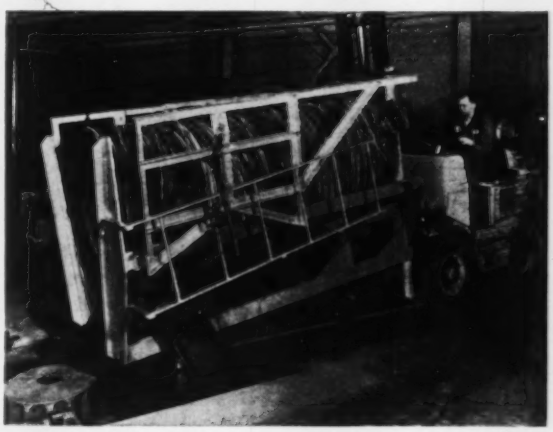
This industrial towing tractor comes in models with gasoline, diesel, or LP gas engines. The engines develop 74 brake horsepower and torque of 170 ft lb at 1200 rpm.

The tractors are 101 in. long, 57½ in. high, and 66 in. wide. Underclearance at the center is 9 in.

The welded steel frame is reinforced and gussetted to assure complete alignment of the drive train.

The front bumper is made of heavy steel plate to protect the tractor and front wheels when the tractor is used as a pusher unit. Gears are heat treated and carburized. *Write*: Allis-Chalmers Mfg. Co., Milwaukee, Wis. *Phone*: Spring 4-3600

Machine Simplifies Handling of Rod and Wire Coils



This hydraulic loading and stripping machine can load or unload a complete stack of coils in a single operation. Only one operator is needed to handle rod or wire.

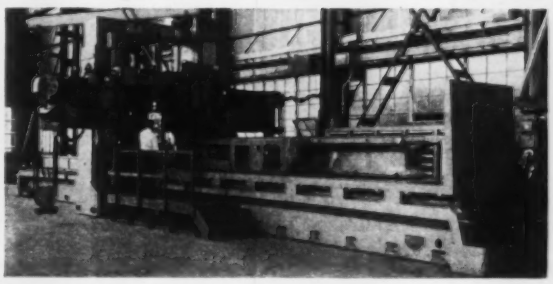
The stack to be loaded is placed in the trough of the loading machine by a standard ram truck or a C hook.

The loading machine upends the coils to a nearly vertical position over the coil pit which holds the empty spider.

Hydraulic cylinders position the spider and elevate it through the stack in perfect position for crane handling.

Unloading is done in reverse. *Write*: Lee Wilson Engineering Co. Inc., 20005 W. Lake Rd., Cleveland 16, Ohio. *Phone*: Edison 1-6600

Surface Grinder Has Two Work Spindles



The Plano surface grinder can handle work up to 80 in. wide. Distance from the grinding wheels to the table top is 60 in.

Hydraulic power provides traversing and jump feeds in increments from ½ to 4 in. Cross feeds in increments of 0.001 or less also can be set at the pendant.

Table feeds range from 5 to 100 fpm; cross slide feeds are from 5 to 30 fpm.

The vertical head swivels up to 50 degrees each way. This enables the machine to grind V and flat ways, dovetails, shoulders, edges, radiuses, and contours in one setup.

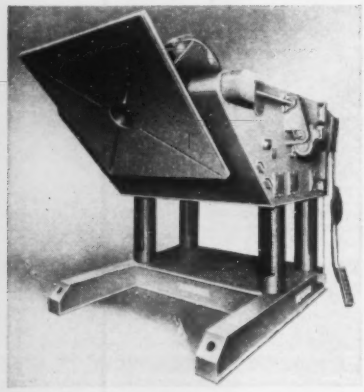
Twenty motors are used on the machine to enable the operator to control all movements from a single station. *Write*: Mattison Machine Works, Rockford, Ill. *Phone*: 2-5521

NEW PRODUCTS and equipment

Welding Positioner

Model GE250 has a capacity of 25,000 lb with the center of gravity 12 in. above the table and 12 in. offcenter.

A four-speed transmission provides speeds of 0.76 to 0.11 rpm for rapid positioning, 0.38 to 0.05 rpm for large weldments and average welding speeds, 0.26 to 0.034 rpm for larger weldments and slower welding speeds, and 0.19 to 0.025 rpm for the largest weldments and slowest speeds.



The cross-sectional column of the base is 47 x 78 in. All elevator mechanisms, including the columns, are inside the chassis. Nothing extends above the top of the chassis to obstruct the turning of large weldments. *Write*: Aronson Machine Co., Arcade, N. Y.

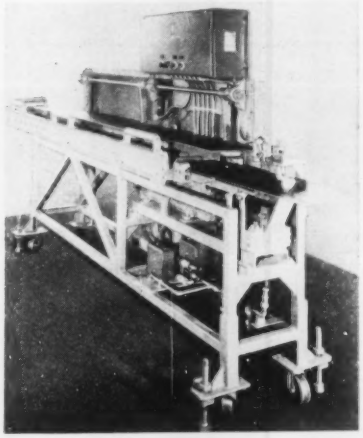
Press Feeder

This automatic unit feeds heavy flat strip (of a thickness beyond the capacity of conventional roll feeds and straighteners) to presses.

The feeder can be adapted to single operation or progressive dies.

Strip stock is rolled manually into a preload station and automatically lowered to a feeding station by arms controlled by air cylinders. The strip is fed into the press by a reciprocating mechanism which has mechanical grippers. The stroke is adjustable.

Electric controls of the feeder can be tied into the press cycle to provide a fully automatic feeder



arrangement. *Write*: Press Automation Systems Inc., 25418 Ryan Rd., Centerline, Mich. *Phone*: Jefferson 9-7750

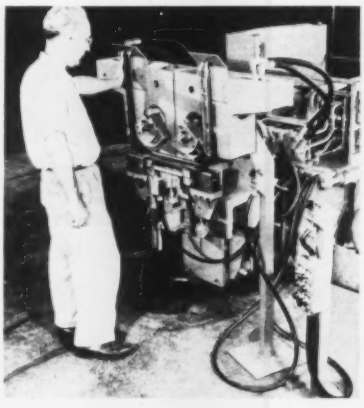
Bender Loads Easily

Vertical design of this bender facilitates material handling in and out of the machine. Two pivoting heads form two 90-degree bends simultaneously in a steel radiator support channel.

When the start button is pressed, the bending forms, mounted on pivoting heads, move in to clamp the workpiece and begin the bends. Wiper shoes move vertically to form the channel around the bending forms. When the bends have been completed, the heads retract and the finished part is ejected automatically.

Galling is virtually eliminated because the wiper shoes are supported in bronze ways which permit the shoes to move with the workpiece during the bending operation.

Power is supplied by a 20-hp motor. Cushion-type cylinders

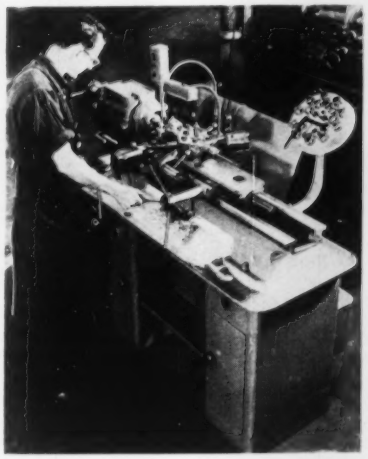


minimize the shock at the end of the stroke. *Write*: Pines Engineering Co. Inc., 601 Walnut St., Aurora, Ill. *Phone*: Aurora 6-7701

Screw Machine

This hand screw machine handles short production runs, from 50 to 1000 pieces. It can make a wide variety of parts, from simple washers and shafts to intricate parts used in the electronic and aircraft industries.

The bed turret has six stations. A turn of the pilot wheel moves the turret from one operation to the next.



The pilot wheel feed combines rapid slide movement with an 8-in. travel which increases the size range of jobs the machine can perform. *Write*: Delta Power Tool Div., Rockwell Mfg. Co., 475 N. Lexington Ave., Pittsburgh 8, Pa. *Phone*: Churchill 1-8400

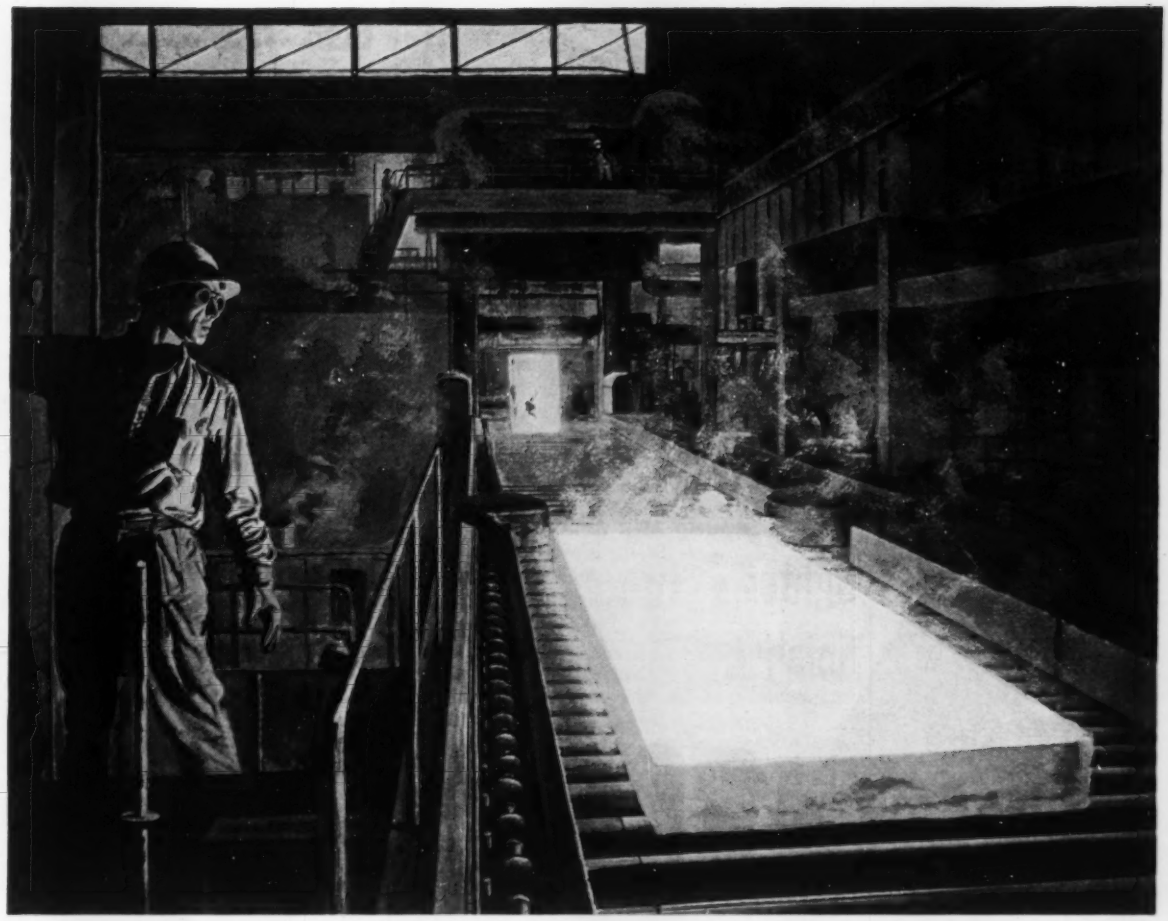
Ultrasonic Cleaner

Model AP-200 Sonogen cleans whenever a surface is in contact with the cleaning liquid. It removes insoluble solids and contaminants. Oil in sintered parts, blind holes, and complicated crevices is washed out easily.

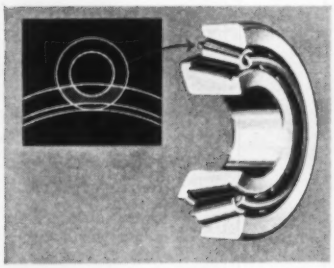
The generator has an average power output of 1 kw with a peak on pulses of 4 kw.

A flexible 6-ft cable connects the generator to a tank-transducer combination. A 25-gal capacity unit is generally used.

The unit cleans by supplying 38 kilocycle pulsed power to the immersed transducer, which converts



Bearings "keep cool" under hot steel!



HIGHER FLANGE IMPROVES ROLLER ALIGNMENT

As shown by the gray area above, the higher flange provides a large two-zone contact area for the roller heads. This greatly reduces wear—practically eliminates "end play". Larger oil groove provides positive lubrication.

Watch it! Coming down the line—another half-formed slab of red-hot steel! And with it comes a supreme test of bearing excellence. Bower Bearings are equal to it—helping to keep this mill operating smoothly and continually despite heavy loads and extreme temperature. Whatever the job, there's a Bower Bearing engineered to perform just as dependably when the going is toughest. Rigid quality controls and basic bearing design refinements like those shown at the left have reduced Bower Bearing failure to a practical minimum. If your product uses bearings, specify Bower! There's a complete line of tapered, straight or journal roller bearings for every field of transportation and industry.

BOWER ROLLER BEARING DIVISION
FEDERAL-MOGUL-BOWER BEARINGS, INC. • DETROIT 14, MICHIGAN

BOWER ROLLER BEARINGS

a bright new wire with a brighter tighter finish

Brytite

A PATENTED GALVANIZING PROCESS ®

SO BRIGHT—Use *Brytite* wherever a shinier, brighter zinc coating is desired for long lasting, more sparkling product appearance. Eliminate polishing and special finishing operations

SO TIGHT—Brytite has remarkable forming qualities. The zinc coating is so tight it will withstand severe deformation of the base metal without flaking, powdering or peeling.

SO CLEAN AND SMOOTH—Satin smooth in looks and feel, BRYTITE immediately raises the quality appeal of your product. You get smoother production, too—the result of precise uniformity and quality controls.

ROUND AND SPECIAL SHAPES—*Brytite* is available in many sizes in round wire, and may on inquiry, be furnished in standard and special shapes—flat, half-round, oval, half-oval, square, rectangular, and many others.

TEMPERS AND ANALYSES—Specify BRYTITE in various tempers and analyses in the low carbon and medium low carbon steels.

FINISHES—Satin Finish, Unwiped (where a heavy weight of zinc coating is required) and Redrawn, in certain sizes.

no polishing...no buffing...no finishing...

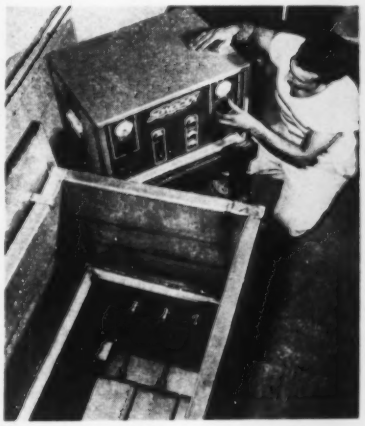
withstands difficult forming operations

CONTINENTAL STEEL

CORPORATION · KOKOMO, INDIANA

PRODUCERS OF Manufacturer's Wire in many sizes, tempers and finishes, including Galvanized, KOKOTE, BRYTITE, Flame-Sealed, Coppered, Tinned, Annealed, Liquor Finished, Bright, and special shaped wire. Also Welded Wire Reinforcing Fabric, Nails, Continental Chain Link Fence and other products.

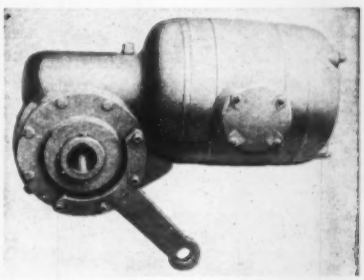
NEW PRODUCTS and equipment



the electric energy into mechanical vibrations of the same frequency. *Write*: Branson Ultrasonic Corp., 40 Brown House Rd., Stamford, Conn. *Phone*: Davis 4-6721

Gear Motors

This shaft mounted, right angle line of gear motors includes models from ¼ to 5 hp.



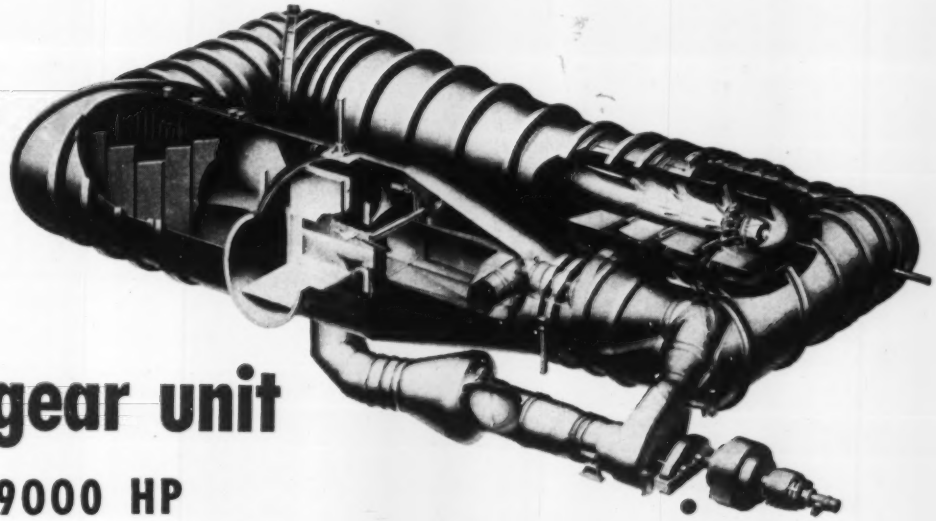
No intermediate elements, such as couplings and sprockets, are needed. *Write*: Sterling Electric Motors Inc., 5401 Telegraph Rd., Los Angeles 22, Calif. *Phone*: Raymond 3-6211

Die Lubricant

Graphite Suspension No. 74 is a water-graphite lubricant for extrusion dies and permanent molds.

The material is ready to use as soon as water is added. The jelly-like lubricant becomes free flowing when water is added. Usually mixing or stirring is not needed.

The lubricant contains no ammonia or other corrosive ingredient. A small amount of caustic



Farrel® gear unit

transmits 9000 HP to transonic wind-tunnel compressor

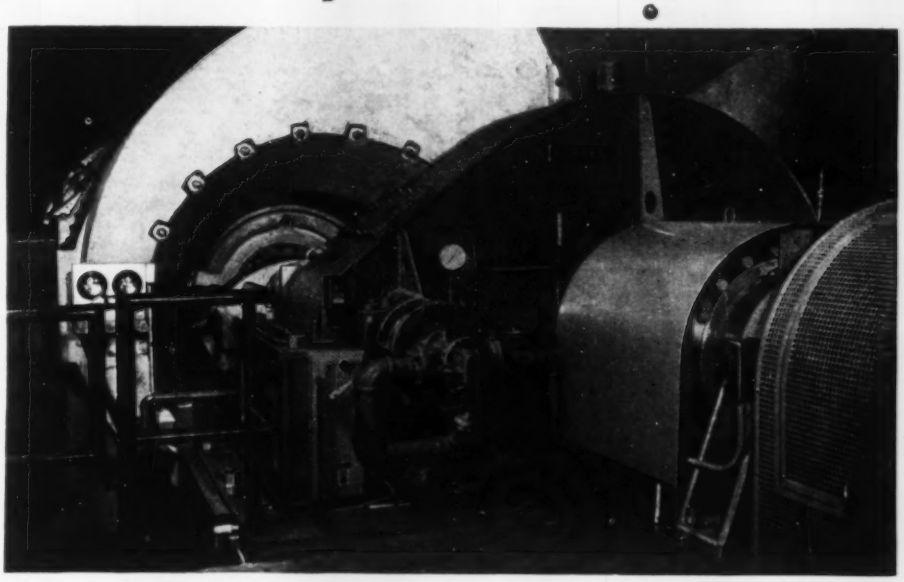
One of the important test facilities in the aviation industry is the eight-foot transonic wind tunnel at Cornell Aeronautical Laboratory, Buffalo, N. Y. In the tunnel's auxiliary system, an axial-flow compressor withdraws air from the boundary area of the test section to prevent the effect of shock waves on models being tested. This machine is driven by a 9000 HP electric motor through a Farrel speed increaser.

The Farrel unit, which is actually capable of transmitting 12,000 HP, is equipped with a single pair of continuous-tooth herringbone gears. Both gear and pinion were completely finish-machined on their shafts to insure concentricity of pitch diameters with axes of rotation. Teeth were lapped to provide the smooth working surface so essential in high-speed operation.

This is typical of the painstaking care that goes into the making of every Farrel gear unit. It's a good reason to choose Farrel when you need a gear unit for high-speed service.

FARREL-BIRMINGHAM COMPANY, INC.
ANSONIA, CONNECTICUT
Plants: Ansonia & Derby, Conn., Buffalo & Rochester, N. Y.
Sales Offices: Ansonia, Buffalo, Boston, Akron, Ann Arbor (Mich.), Chicago, Minneapolis, Fayetteville (N. C.), Los Angeles, Salt Lake City, Tulsa, Houston
European Office: Piazza della Republica 32, Milano, Italy

Farrel-Birmingham®

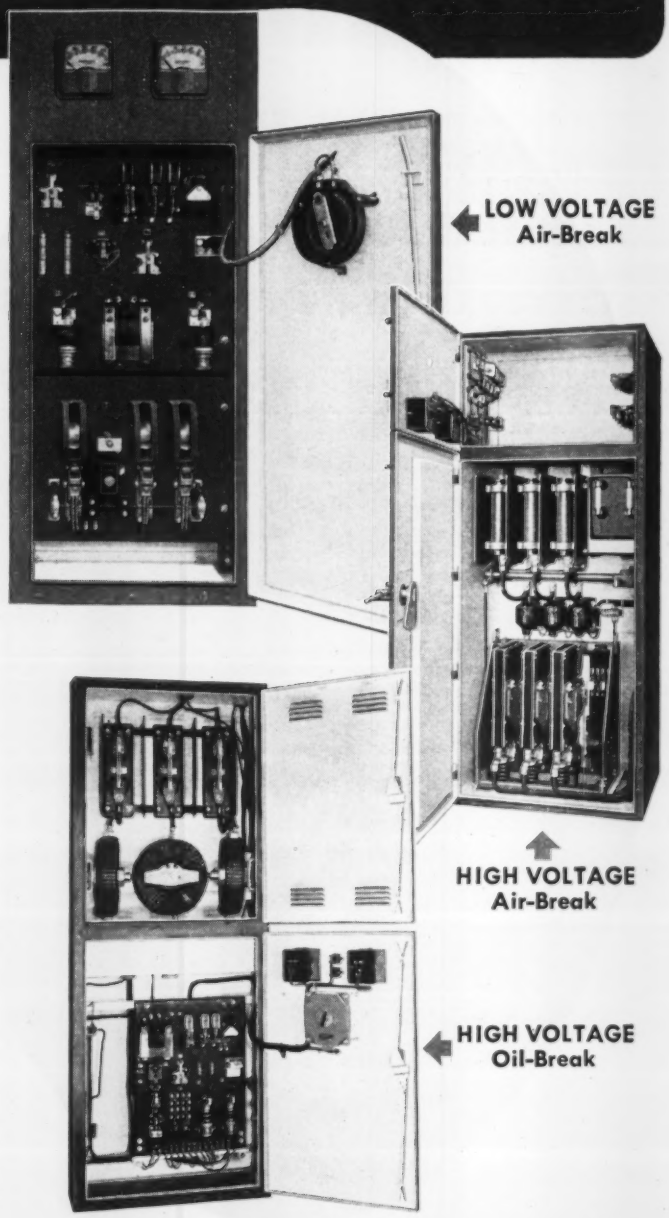


Farrel gear unit steps up the shaft speed of a 9000 HP motor from 570 RPM to 2838 RPM at the output side. Output shaft is connected to compressor — designed to move 600,000 cubic feet of air per minute.

FB-1122

IT'S EC&M FOR A COMPLETE LINE OF SYNCHRONOUS MOTOR STARTERS!

FOR ALL LOW VOLTAGES AND FOR 2200-4800 VOLT POWER SYSTEMS!



Here's Why EC&M Pushbutton Automatic Starters Do The Job Better...

Complete protection during starting, acceleration and while running at synchronous speed.

Motor pulls into step without delay because field is applied under best conditions for synchronization.

Automatic field removal and re-synchronization allow motor to accelerate and re-synchronize after voltage dip or momentary overload.

Easily installed because all internal wiring is complete.

Full or reduced voltage starting All high voltage starters available in 3 ratings: (*1*) 50,000 KVA (certified) interrupting capacity—(*2*) with power-type, current-limiting fuses —(*3*) VALIMITOR® (volt-ampere-limitor), the bus may be of unlimited KVA.

Write for Bulletins 8200 and 8820

THE ELECTRIC CONTROLLER & MFG. CO.
A DIVISION OF THE SQUARE D COMPANY
CLEVELAND 28 • OHIO

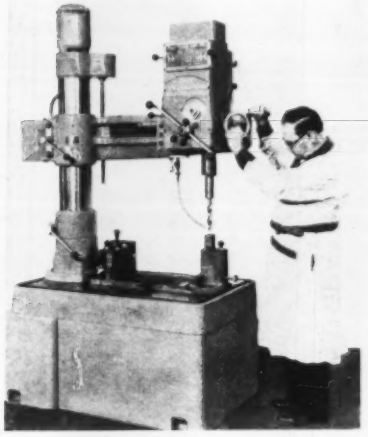
8587

soda is sometimes required when presses operate in temperatures up to 900° F.

The coating can be applied by spraying, brushing, or dipping. *Write*: Joseph Dixon Crucible Co., Jersey City, N. J. *Phone*: Delaware 3-3000

Radial Drill

Working height of this machine is 26 in.; the arm and head are raised or lowered to suit the job. There are 16 spindle speeds.



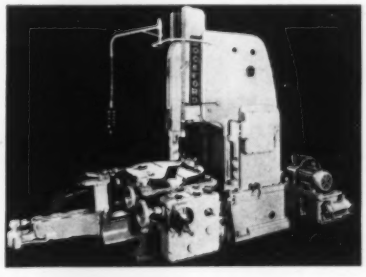
A drill ejector in the spindle makes tool changes; pushbuttons are used to raise and lower the arm. *Write*: Veet Industries, 25753 Groesbeck Highway, East Detroit, Mich. *Phone*: Prescott 6-3000

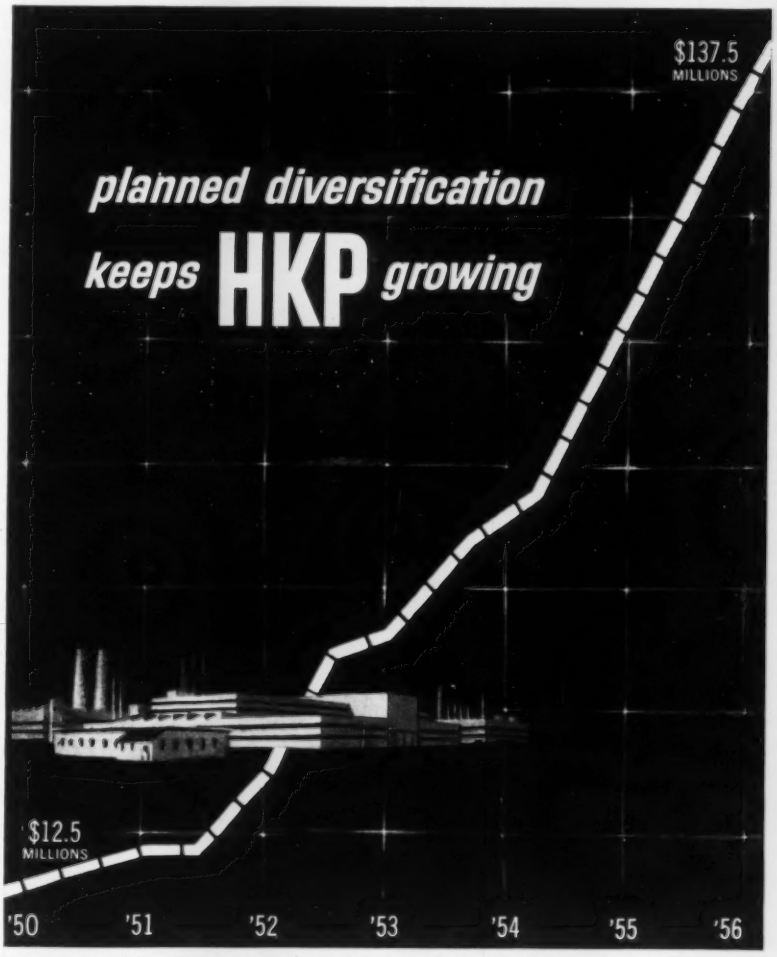
Hydraulic Slotter

This 20-in. slotter can do conventional slotting and complicated tracing work. The changeover can be made quickly.

A traverse movement of the slotter table makes rotary or straight work possible.

Equipped with a sensitive dupli-





Acquisition of The Cleveland Hardware & Forging Company brings to eleven the number of versatile Porter divisions. They manufacture products in 40 plants in the United States and Canada, four of which have been acquired so far this year.

Serving industry's needs is a prime responsibility at H. K. Porter Company, Inc. Porter maintains intensive development programs which are translated into new manufacturing developments almost every month.

This awareness of the needs of the market place has resulted in a program of planned diversification...**and a 1150% increase in Porter business volume since 1950.** This volume comes from divisions manufacturing steel and fabricated steel products, copper-alloy metal products, electrical equipment, refractories and industrial rubber, wire and cable.

H. K. PORTER COMPANY, INC.

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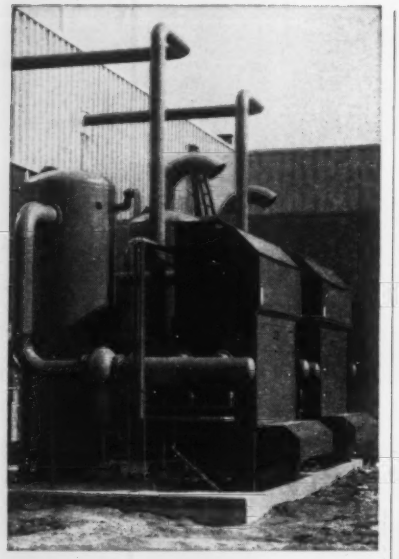
LESCHEN WIRE ROPE • QUAKER RUBBER • REFRACTORIES • VULCAN CRUCIBLE STEEL • W-S FITTINGS
H. K. PORTER COMPANY (CANADA) LTD.



This Niagara Aero After Cooler also cools compressor jacket and intercooler water.

COMPRESSED AIR
• Lower in Cost
• Drier and Cooler

THE NIAGARA *AERO* AFTER COOLER offers a completely self-contained method replacing both shell-and-tube cooler and cooling tower. It is independent of a large supply of cooling water and consistently reduces compressed air temperatures to below ambient.

Drier air gives you better operation and lower costs in using all air-operated automatic instruments, tools and machines, paint spraying, sand blasting and moisture-free air cleaning.

Direct saving in the cost of cooling water saves the price of the Niagara *Aero* After Cooler in less than two years.

Niagara *Aero* After Cooler assures all these benefits because it cools compressed air or gas below the temperature of surrounding atmosphere; there can be no further condensation in your air lines. It condenses the moisture by passing the air through a coil on the surface of which water is evaporated, transferring the heat to the atmosphere. It is installed outdoors, protected from freezing in winter, proven in service on the largest plant utility systems.

Write for Bulletin No. 130

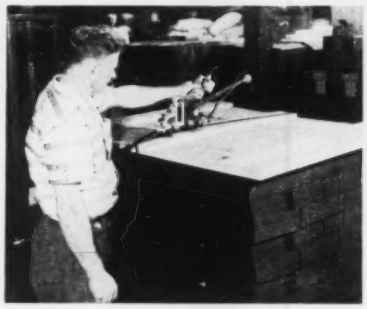
NIAGARA BLOWER COMPANY
Dept. S-11, 405 Lexington Ave.
NEW YORK 17, N. Y.
District Engineers in
Principal Cities of U. S. and Canada

cator, the slotter will produce its own working templates from a toolroom master or a finished workpiece.

The stroke length can be adjusted while the ram is in motion. *Write*: Dept. 213, Rockford Machine Tool Co., Rockford, Ill. *Phone*: 3-7611

Strapper Is Powered

Model AE is a strapping machine that uses a 115-volt motor to provide unvarying tension. A single stroke hand lever seals and cuts the strap.



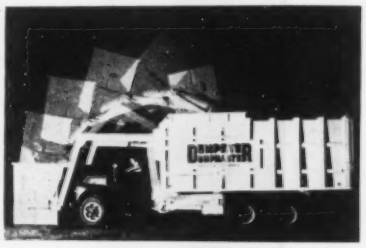
A wrench is used to set the desired tension. When 75 seals are in its magazine, the strapper weighs only 2 lb.

Up to 1600 lb of tension can be used with $\frac{5}{8}$ or $\frac{3}{4}$ in. strap. *Write*: Signode Steel Strapping Co., 2600 N. Western Ave., Chicago 47, Ill. *Phone*: Armitage 6-8500

Waste Collector

Dumpmaster CA can load more than 60 cubic yards of material for transfer to a disposal area.

Mechanical lifting arms pick up the containers by engaging channels on the sides. Contents are dumped through the top bay of the body where average waste material is hydraulically compressed



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CHARLES MUNDT & SONS
53 FAIRMOUNT AVE.
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PHONE—DELAWARE 3-6200
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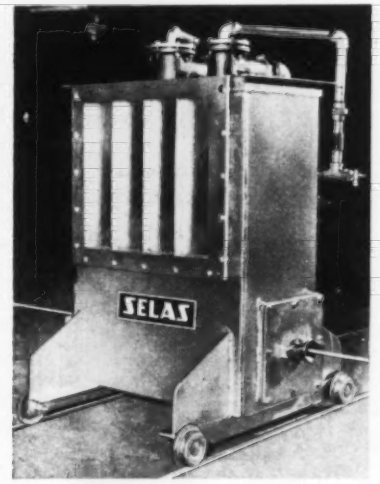
to one-third its former volume.

The driver does not have to leave the cab while the unit is operating. *Write*: Dept. DM-62, Dempster Bros. Inc., Knoxville 17, Tenn. *Phone*: 4-1671

Wire Furnace

This furnace heats tungsten and molybdenum rod for swaging. It is used for continuous processing of rod and wire for heat treating and hot working.



Chamber temperatures as high as 3200° F are produced with low pressure gas (manufactured, mixed, natural, or liquefied petroleum) and air. *Write*: Selas Corp. of America, Dresher, Pa. *Phone*: Mitchell 6-6600

Metallurgical Microscope

The Series 2200 microscopes have circular stages that permit rapid, precise specimen positioning under the objective in any horizontal direction.

Four interchangeable bodies — monocular, binocular, trinocular, and monocular photographic—are available. A 35-mm camera can be mounted on the trinocular or the monocular photographic body.

A vertical illuminator provides an intense light source (6.5 volts, 2.75 amperes) which is controlled by aperture and field diaphragms.

Combinations of eyepieces and achromatic coated objectives can

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Here's a word of advice, just in case you run into a problem in metal selection, fabrication or machining . . . or are faced with unusual service conditions or product requirements. You can get help from Riverside-Alloy's Technical Service Dept. Their wide experience with non-ferrous alloys through the years is at your service. Expert technical service is a Riverside-Alloy extra that stands behind our line of phosphor bronze, nickel silver, cupro-nickel, beryllium copper, stainless steel and nickel alloys. For information on our quality wire, rod and strip for your products, write to Riverside-Alloy Metal Division.

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DIAPHRAGM TYPE VALVES

Automatically protect against damage from excessive pressure build-up. Provide controlled operation for fluid recirculating systems.

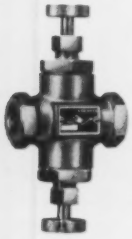
Easily adjusted to relieve at desired pressure. Relief settings: 0-15 psi, 0-50 psi, 0-75 psi, 0-125 psi, 0-250 psi for pipe sizes ⅛" through ½", and 0-15 psi, 0-50 psi, 0-75 psi, 0-125 psi for ¾" and 1" pipe sizes.

POP SAFETY VALVES

Prevent the build-up of dangerous, excessive pressures in air tanks. Valve automatically pops open at desired setting. Pipe sizes ⅛", ¼", ⅜" and ½".

LOW FLOW RELIEF VALVES

Small, inexpensive valves suited for a wide variety of uses requiring relief at low rates of flow. ⅛" and ¼" pipe sizes.



FLOW CONTROL VALVES,
Two-Way—Single-Way

For accurate control of air and hydraulic cylinders. Provide large volume flow with low pressure drop, easily and quickly regulated. ¼", ⅜" and ½" pipe sizes.

NEEDLE VALVES

Tapered needle provides controlled metering of air, liquids and gases that do not affect brass. Leak-proof. Choice of five types in ⅛" and ¼" pipe sizes.

For complete information, call your nearby Norgren Representative listed in your telephone directory... or

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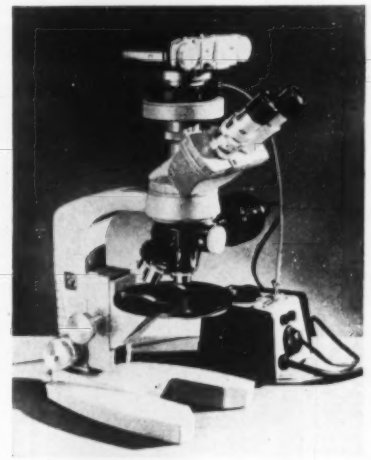
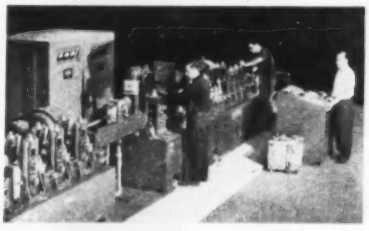


be selected to provide any desired series of magnifications. *Write*: Instrument Div., American Optical Co., Buffalo 15, N. Y. *Phone*: Cleveland 7544

Tube Mill Is Versatile

The 2KU tube mill can make tubing up to 2½ in. OD. In switching from one metal to another, it is necessary only to regulate



speeds to suit welding requirements of the metal.

Commercial aluminum tubing is produced at the rate of 260 fpm. *Write*: Abbey Etna Machine Co., Perrysburg, Ohio.

Steel Strapping Tool

The B5 Stretcher comes in light, medium, and heavy duty models. Every strap size from ¼ x 0.010 to ¾ x 0.035 in. can be handled.

The tool is balanced so that the strap can be applied with ease from any direction with the tool in any position.

Strap can be inserted quickly and the tool removed easily after use.

A rotary gripping dog gives continuous takeup. The seal can be

"for long, long blade life—

choose a DISSTON!"

Does your work call for close tolerance cutting . . . fine edge-holding qualities . . . good finish? Disston Metal Cutting Band Saws give you all that and more —*long, long blade life!*

LANCER TOOTH—Hard edge blade with positive rake angle tooth. Permits high-speed production cutting of non-ferrous metal, wood and plastic. Cuts brass and aluminum solids and Plexiglas with equal ease.

REGULAR TOOTH—Hard edge flexible back band saw with finer tooth spacing. Cuts all ferrous metals and thinner sections of non-ferrous metal and plastic. Excellent for sawing angle iron, steel tubing, nickel plate and brass sheets.

Your Disston distributor is the man to see if production is too low and costs too high. He can help you boost one and lower the other.

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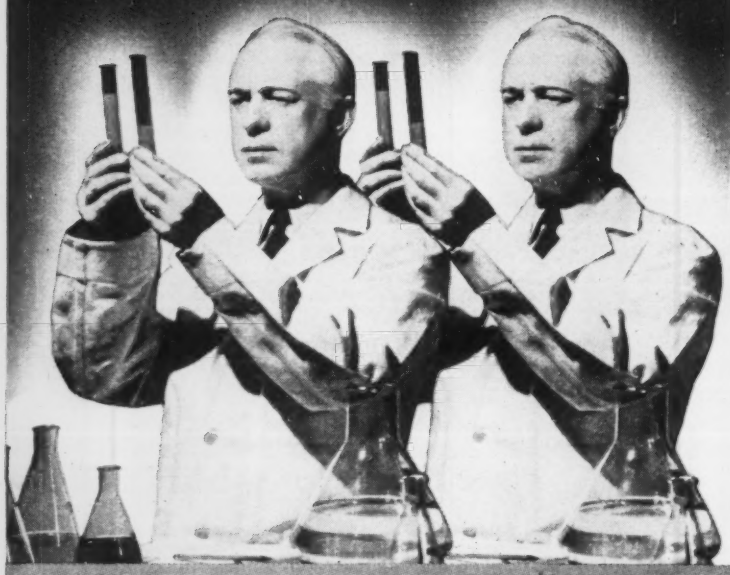
To obtain YOUR FREE COPY of Disston's colorful, information-packed booklet on Metal Cutting Band Saws, write today to Dept. 26 Henry Disston Division, H. K. Porter Company, Inc., Philadelphia 35, Pa.

H. K. PORTER COMPANY, INC.

Henry DISSTON DIVISION

Only degreasing solvent with DUAL ACCEPTANCE



NEW DETREX

PERM-A-CLOR® (NA)

(TRICHLORETHYLENE)

Now, "Dual Acceptance" means greatly increased efficiency and economy for solvent degreasing operations because PERM-A-CLOR* NA contains acid acceptors that assure a new high degree of stabilization. Functioning in both the presence and absence of moisture, these acid acceptors also provide outstanding resistance to the widest range of industrial soils on any metal or combination of metals.

Through higher stability, PERM-A-CLOR* NA can be used, distilled and re-used while retaining full strength. The number of parts degreased per pound of solvent is greatly increased, while solvent loss is cut to a minimum. Costly down-time for maintenance is reduced because of PERM-A-CLOR's* remarkable, long-life stability.

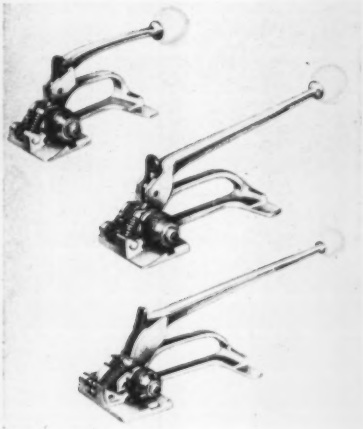
Complete DETREX facilities include—degreasing solvents—alkali cleaners—emulsion cleaners—phosphate conversion coatings—degreasing equipment and industrial washers—Ultrasonic cleaning machines—unexcelled technical counsel and engineering field service.

*PERM-A-CLOR is the registered trademark of

DETREX CHEMICAL INDUSTRIES, INC.

BOX 501, DETROIT 32, MICHIGAN

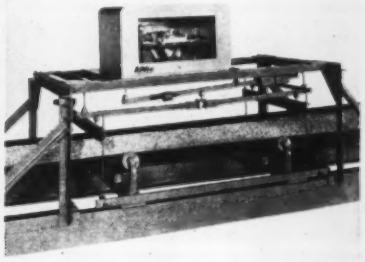
NEW PRODUCTS and equipment



applied in front of the tool or in back of the dog. *Write*: Acme Steel Co., 135th Street and Perry Avenue, Chicago 27, Ill. *Phone*: Interocean 8-9500

Conveyor Scale

Flow of materials can be controlled, blended, and proportioned by this belt conveyor scale. It weighs and totalizes free-flowing bulk materials.

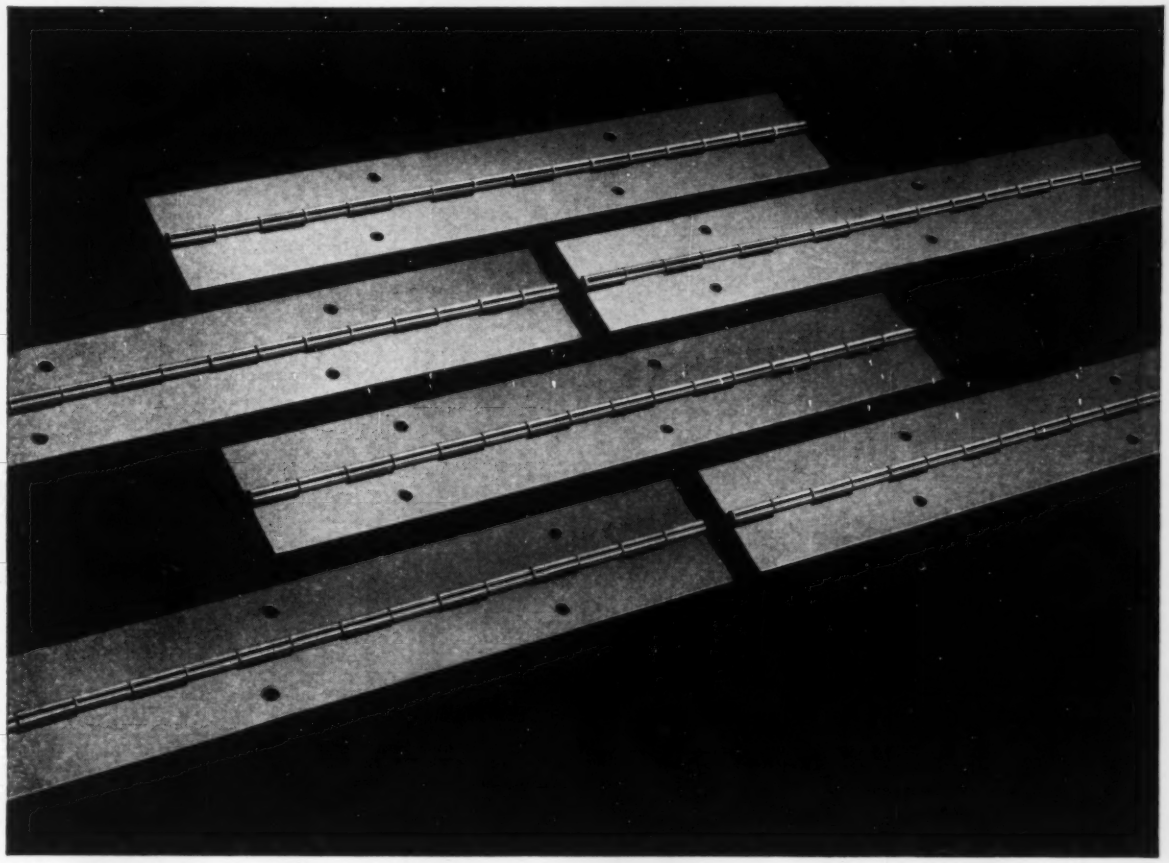


Mechanical linkages are used in the weight measuring and registering systems. The scale is accurate to 0.5 per cent of flow over its entire weight range. Units are available for any belt width. *Write*: ABC's Scale Div., McDowell Co. Inc., 16300 Waterloo Rd., Cleveland 10, Ohio. *Phone*: Ivanhoe 6-1500

Lift Truck

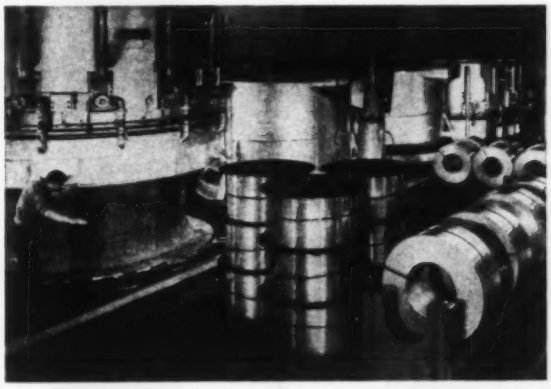
Special handling jobs are performed by this truck. It has channels that go below ground level.

Typical uses: Handling in pits, lowering palletized materials into dipping or cleaning tanks, trans-



"Anaconda Aluminum is the best metal we've found!" Lake Park Metal Stamping, Inc., Youngstown, Ohio

"Anaconda Aluminum gives us the best forming for our piano hinges and is consistent, shipment after shipment," says Mr. James Cain, president of Lake Park Metal Stamping, Inc., hardware manufacturer.



Available for prompt shipment to all points in the U. S.
Anaconda Aluminum Coiled Sheet in gages from 0.006" to 0.064" and in widths up to 28"; coils up to 100 pounds per inch of width, in alloys: 1100, 3003, 3004, 5005, 5050, 5052.

"But even more important is the service," he adds. "We are extremely pleased with the prompt handling and delivery of our orders."

For piano hinges shown above, Lake Park uses Anaconda Aluminum Alloy 5050-H36, 1½" wide by .050" gage, in coils of 16"-18" ID and 36"-46" OD.

HIGH QUALITY AND PROMPT SERVICE

With the most modern equipment for rolling, annealing, and slitting—embodying the latest refinements in control — the Torrington Division of The American Brass Company is in a position to offer extraordinarily good service in high-quality aluminum coiled sheet.

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American Brass Company sales offices are located in principal cities from coast to coast. Or contact The American Brass Company, Torrington, Conn. Telephone HUnter 9-3161.

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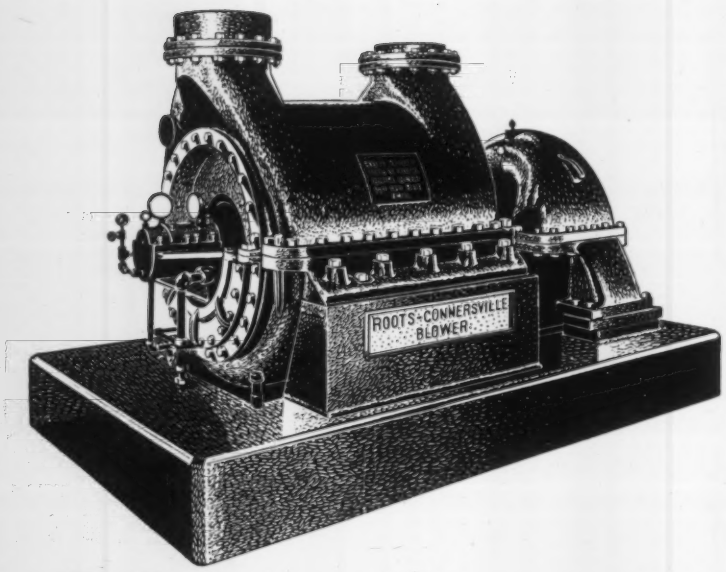
ALUMINUM COILED SHEET
Made by The American Brass Company



R-C centrifugal blowers assure accurate control of volume and pressure

At any speed, Roots-Connersville centrifugal blowers assure uniform delivery of air or gas without the use of receivers. In matching supply to changing demand, this inherent operating advantage simplifies accurate and instantaneous control of volume and pressure.

R-C centrifugals may be direct-connected to high speed electric motors or turbines. Operating speeds may be further raised with speed increasing gears. Occupying a minimum of space and perfectly balanced, with semi-rigid bearing supports to dampen vibration, they do not require special, costly foundations.

Liberal design of diffuser and return passages results in low velocities, normal efficiency even when build-up occurs and exceptionally quiet operation. Operating without internal lubrication, oil-free air is discharged, making it ideally suited for exacting process applications. For complete specification details, write for Bulletin 120-B-14.

Engineers—unusual career opportunities await you at Roots-Connersville. Address your resume to Professional Employment Manager.

ROOTS-CONNERSVILLE BLOWER

A DIVISION OF DRESSER INDUSTRIES, INC.

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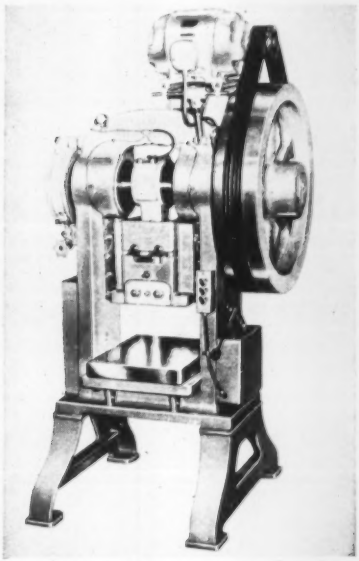
NEW PRODUCTS and equipment

ferring material in a varied floor level plant.

The 6000-lb capacity model can raise loads from 72 in. below the floor to 41 in. aboveground. *Write*: Yale & Towne Mfg. Co., 11000 Roosevelt Blvd., Philadelphia 15, Pa. *Phone*: Orchard 3-1200

80-Ton Press

No. 8 Model I is a straight side, flywheel press with a solid frame. The machines can be used for blanking, forming, embossing, and similar operations.



Both plain and geared models of the press are available. They are made to the customer's specifications. *Write*: Perkins Machine Co., Warren, Mass. *Phone*: Hemlock 6-7771

Electrode Is Fast

Airco 90C is an electrode used with small transformer power sources for all-position welding of light gage mild steel. It provides good penetration at rapid travel speeds.

An easy starting tip arcs immediately under low open-circuit voltage. The arc is quiet and steady, and the coating aids in controlling metal transfer. Complete slag coverage is maintained without arc interference.

Physical properties of the de-

posit are: Tensile strength, 76,400 psi; yield strength, 66,500 psi; elongation in 2 in., 24.5 per cent; and reduction of area, 51.0 per cent. *Write*: Air Reduction Sales Co., division of Air Reduction Co. Inc., 150 E. 42nd St., New York 17, N. Y. *Phone*: Murray Hill 2-6700

Stretcher and Cutter

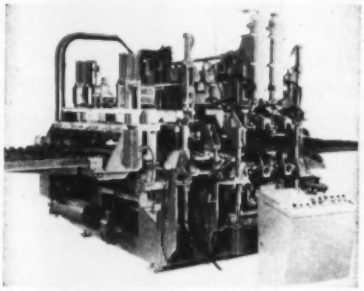
Model 7C is a drum type tool used on ¾ and 1¼ in. heavy duty strapping.

The tool is available with or without the cutoff feature. *Write*: Brainard Steel Div., Sharon Steel Corp., Warren, Ohio.

Lap Seam Welder

This resistance welder joins strips of aluminum alloys for continuous processing. It handles strips up to 64 in. wide of alloys such as 61S, 24S, and 75S from 0.010 to 0.080 in. thick.

Either plain or Alclad aluminum strip is fed into the welder before heat treating. A built-in shear cuts the trailing edge of one uncoiled strip and the leading edge of the



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Fifth wheel steer. Pneumatic tires. Steel deck. Oak end and side racks.

CUSTOM-BUILT and quality-built for long-time, low-cost service. Flat steel wheels, solid rubber or pneumatic tires. Fifth-wheel or four-wheel knuckle steer. Steel or wood deck, or special superstructure. Any desired capacity.

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NO WEIGHT LIFTING!

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Why be a weight lifter when Sterlings are available to carry the brunt of the load? The perfectly balanced construction of Sterling Wheelbarrows permits 80% of the load to be carried on the wheel . . . only 20% is carried by the barrow man. And smooth-running, anti-friction bearings make the load seem even lighter. The saving in muscle power increases job efficiency. Crews work faster, make more trips per day. Actually, you'll find Sterlings cost less per year.

Write for catalog.

STERLING WHEELBARROW CO., Milwaukee 14, Wis.

Look for this Mark of STERLING Quality

Sterling WHEELBARROWS

A 8746–½R

following strip.

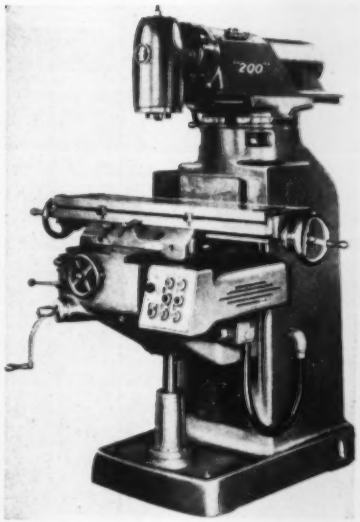
Four welding wheels move across the overlapped edges, joining the two strips. Mechanical transfer devices in the welder receive the strip, position it, and move it toward a continuous heat treating line after it is welded.

Two 250-kva transformers power the machine. *Write*: Taylor-Winfield Corp., Warren, Ohio. *Phone*: 2252-1

Vertical Milling Machine

The Model 200 mill is driven by a built-in motor. The rotor, placed at the rear of the ram for balance, mounts directly on the first change gearshaft to transmit power directly.

Lapped, spiral bevel gears are used for the final angle reduction to provide the quiet, smooth spindle speeds needed for good surface finishes. Twelve spindle speeds are provided in a range of 80 to 2100 rpm for the 2-hp machine.



An opening between the knee and the column face allows chips to pass through.

The overarm turret, 15 in. in diameter, permits accurate positioning of the spindle head over a large work area.

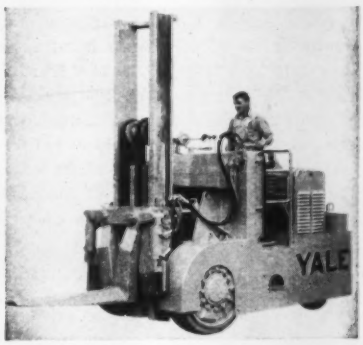
A 1-hp model is suited for toolroom use. *Write*: Famco Machine Co., Kenosha, Wis. *Phone*: Olympic 4-3516

Fork and Ram Trucks

The 15,000 and 16,000 lb capacity models of the K-48 line are suited for lightweight coil handling in the nonferrous metals industry.

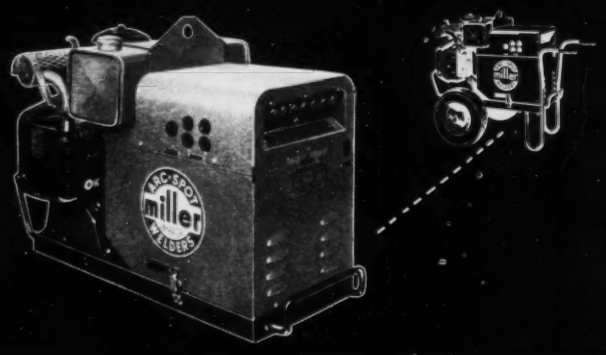
The trucks measure 124 in. from the rear of the counterweight to the face of the fork carriage and are 61 in. wide.

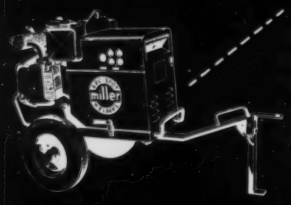
Dual operating stations provide



extra visibility. The truck can be powered by a battery or by a diesel or gasoline engine. *Write*: Yale Materials Handling Div., Yale & Towne Mfg. Co., 11000 Roosevelt Blvd., Philadelphia 15, Pa. *Phone*: Orchard 3-1200

NEW!





Now equipped with a new and larger Onan 12.9 hp engine, the new Miller AEA-200-L produces a full 225 amperes of continuous rated, high cycle welding current or, 5 KW of 110/220 ac power for operation of power tools, lights, milking machines, etc., or, 1 KW of dc power.

Contractors, job weldors, farmers and many industries have shown a continuing high regard for the AEA's weatherproof ruggedness, easy portability and instant changeover versatility from ac welder to power plant to pipe thawer.

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This brake is so large that the bed had to be detachable because of railroad clearance limitations encountered in shipping. It bends 20'-0" x ½" steel plate and is equipped with Steelweld's own tried-and-proven air-operated clutch and brake.

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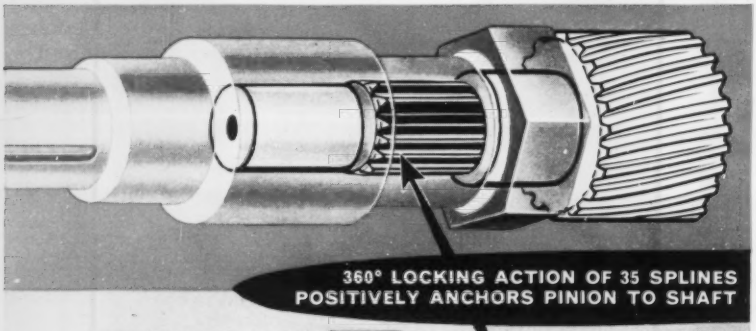
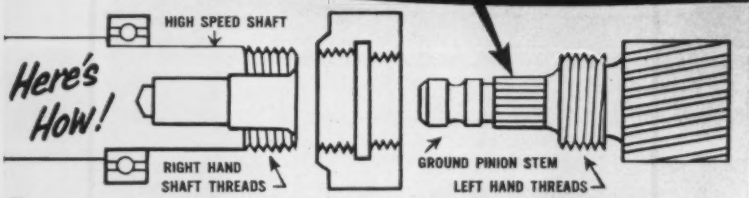
to guarantee better power transmission





* ¾" bore. Other sizes have proportionately more or less splines.

SPLINE DRIVE **PINION** advantages:

1. MORE LOCKING AREA

Self-broaching splines provide more internal locking surface than any other pinion . . . assure positive anchoring, even under reversing conditions.

2. GREATER STRENGTH

Gear and shank are machined from one piece. Solid construction and spline lock provide greater strength—no weakness due to projecting keyway.

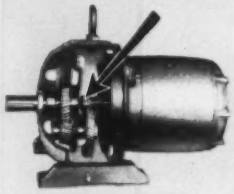
3. PERMANENT, ACCURATE ALIGNMENT

Self-centering action of ground pinion shank in the accurately bored high speed shaft assures accurate assembly and alignment for smoother performance.

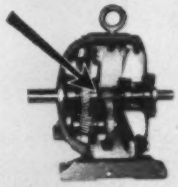
4. DUTI-RATED GEARING

Foote Bros. Spline Drive Pinions have the famous Duti-Rated Gear—harder, tougher and more accurate, with greater load carrying capacity for their size than any other gearing.

Standard In GEARMOTORS AND LINE-O-POWER UNITS



GEARMOTOR



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SPLINE DRIVE PINIONS are another example of Foote Bros. leadership . . . another reason you can be sure you're buying the finest when you buy Foote Bros. Power Transmission Equipment.

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NEW literature

Write directly to the company for a copy

Zinc Diecasting

This 31-page booklet presents data on the factors that influence the production of sound zinc alloy diecastings with good surface finish. Causes of defects and how they may be avoided are covered. Henning Bros. & Smith Inc., 91-127 Scott Ave., Brooklyn 37, N. Y.

Metalworking Presses

Bulletin 6.17, 16 pages, describes uses of four column, single action hydraulic presses. Lake Erie Machinery Corp., 1002 Woodward Ave., Buffalo 17, N. Y.

Automatic Welding Machines

Case histories of machines developed for special jobs in welding automotive parts are presented in this 6-page bulletin. Dix Engineering Co. Inc., 1415 Dix Rd., Lincoln Park 25, Mich.

Buffing Compound

A liquid compound applied automatically and the equipment it requires are covered in Bulletin LC-100, 4 pages. Hanson-Van Winkle-Munning Co., Grand Rapids, Mich.

Precision Casting

Advantages of the Accu-Cast process of making mold and die components are described in this 4-page bulletin. Manco Products Inc., 2401 Schaefer Rd., Melvindale, Mich.

Welding and Cutting

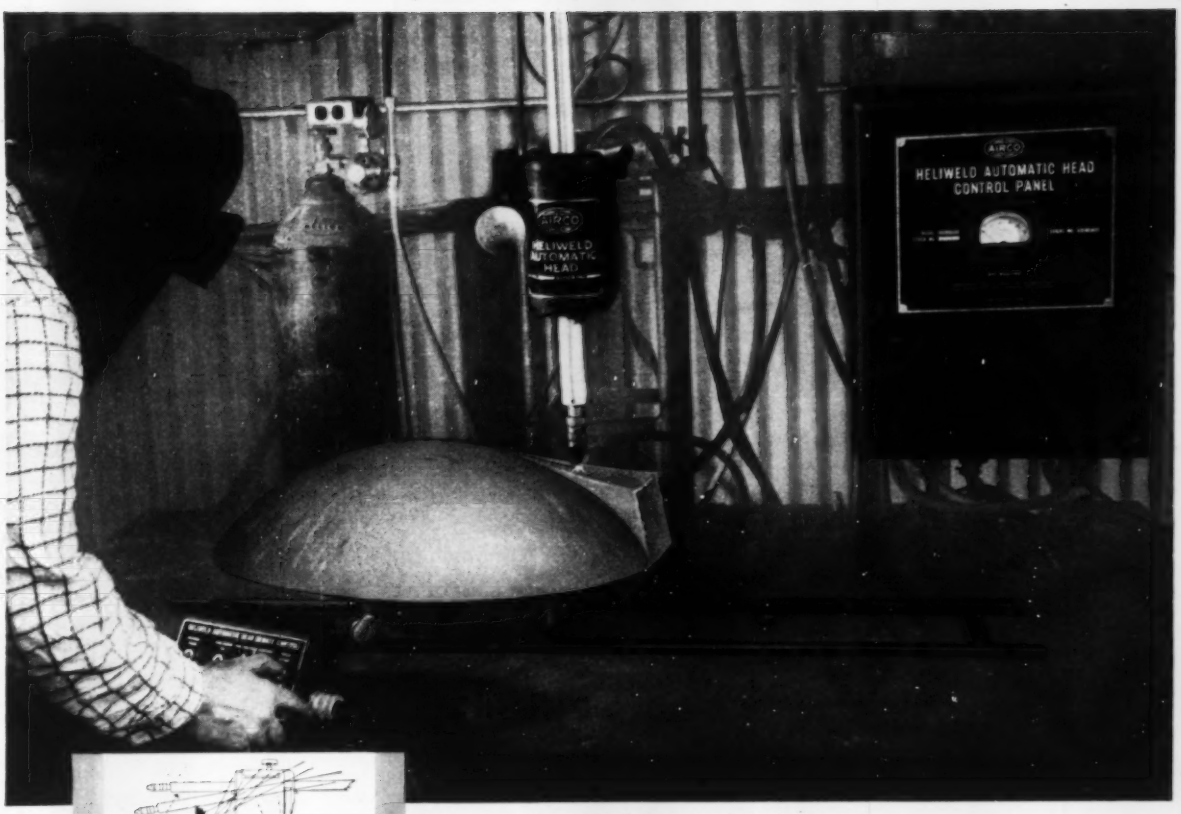
This 20-page bulletin, ADG 2057C, describes bulletins, motion pictures, and sound slide films covering the uses of industrial gases, welding and cutting techniques, and equipment. Air Reduction Sales Co., division of Air Reduction Co. Inc., 150 E. 42nd St., New York 17, N. Y.

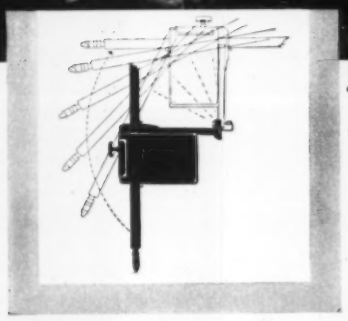
Toolroom Grinding

This 24-page bulletin covers the grinding of alloy, high speed, and die steels. Reference charts list grinding recommendations and the grindability of steels. Advertising Distribution Section, Carborundum Co., P. O. Box 477, Niagara Falls, N. Y.

Barrel Finishing

An aluminum oxide abrasive (chips and screened grain sizes) for barrel finishing is described in a 4-page bulletin, ESA-236. Simonds Abrasive Co., Tacony and Fraley Streets, Philadelphia 37, Pa.





New Airco Model C Heliweld automatic head operates at all angles from horizontal to vertical.

Airco introduces New Automatic Heliweld Head for long-run production welding

The Model C Heliweld automatic head is specifically designed for long-run production on regular or irregular contours – aluminum tubing, motor stators, irregularly-shaped pressure vessels. Its prime advantage is that once the required arc length is set the head will automatically maintain this distance by moving the holder up or down to follow the contours of the work piece. Other benefits are:

- **Versatility** – unit provides good arc voltage control using either argon or helium shielding gases or mixture of both.
- **Adaptability** –the head can be operated at all angles from the horizontal to the vertical (normal) position. The maximum raise-lower distance of the electrode holder is a full 16".
- **Flexibility** – the assembly can be used for AC or DC welding, with or without filler wire. Electrode diameters range from .020 to $\frac{1}{8}$".

The use of the new automatic head will be required where welds of consistent dimensions and quality are important and where good weld appearance is necessary or where welding specifications are very high for the electrical, aircraft, and refrigeration industries. Complete information covering the wide range of applications and detailed specification data is available. Write Airco at the first opportunity.

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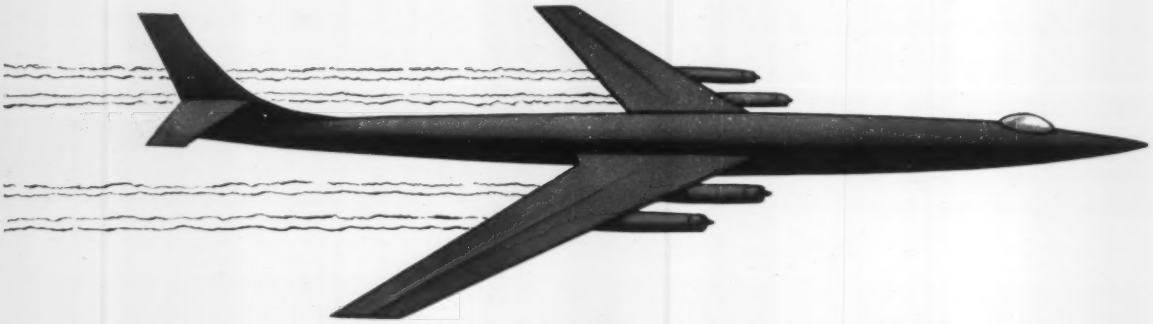
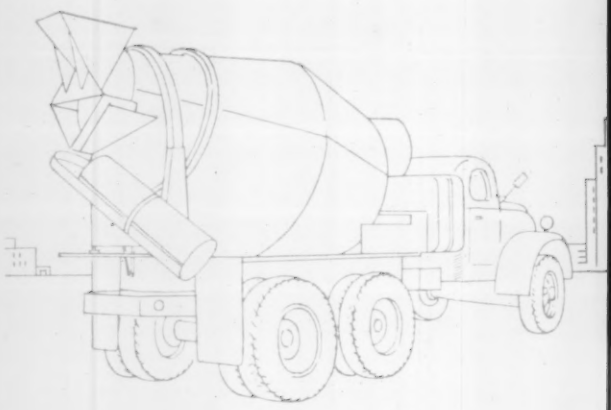
IN AIR, ON LAND AND ON THE SEA . . .
AIRCRAFT QUALITY* AND OTHER STEELS OF

Acme-Newport



**Plate, sheet and strip in alloy and carbon grades*



Standing high in the ratings by prime and subcontractors of airplane parts, missiles and Jatos, are Acme-Newport's aircraft quality plate, sheet and strip, including the essential chrome-molybdenum AISI 4130 type. Other steels from Acme-Newport also continue to serve defense on land and sea, and general industry everywhere.

Such recognition is further proof of this 72-year-old basic steel producer's adherence to uniformly high quality, exact conformance to specification, and complete control of every step in steelmaking. Acme-Newport metallurgists would like to discuss your needs and our facilities for filling them.

Acme-Newport Steel COMPANY
NEWPORT, KENTUCKY
A SUBSIDIARY OF ACME STEEL COMPANY

STEEL
November 11, 1957

Market Outlook

PUBLIC reception of new automobiles will figure prominently in steel industry planning the next several months. Steelmakers are looking to autos to provide the nudge in demand needed to get ingot operations out of the rut.

PROMISING SIGN—The fact auto production is spurting at a faster pace than it was a year ago is encouraging.

The statistics: Passenger car output in the week ended Nov. 2 was 127,991 units, more than five times the number produced in the first week of October. It compares with 104,987 in the preceding week and 117,583 in the like week last year.

INSURANCE PRODUCTION—Steelmakers are aware that volume auto steel needs may develop before public acceptance of the new cars is clearly demonstrated. They reason: Should a mid-1958 auto strike threaten, builders may step up their schedules early next year to assure adequate dealer stocks of cars later.

SITUATION MIXED—Steel market conditions generally appear mixed. In some areas, demand is holding steady; in others, it is still contracting. Over-all, the trend seems to be downward.

The comparatively easy situation largely mirrors consumers' efforts to hold inventories down, since it is generally agreed consumption is outstripping new orders.

OPENING BOOKS—Mills are opening books for first quarter orders on virtually all products. But incoming business is light, and producers are not too confident a pickup of substantial proportions will come this quarter.

Automakers are taking about the same tonnage as they have recently, and give no indication of increasing requirements soon. Some appliance makers are doing well (home laundry equipment), but road machinery sales are disappointing, and manufacturers are curtailing. Construction is waning seasonally.

EASINESS SPREADS—Sheets and bars have been in easy supply for months. Shapes and plates, which have been in critical supply, are getting into better balance rapidly. One shapemaker is no longer allocating ahead.

The move reflects seasonal slackening in structural activity, including highways and bridges.

INQUIRY SLACKENS—Makers say inquiry for sheared plates is leveling out, with capital expenditures dipping. They still hold substantial backlogs, but pressure is off the market.

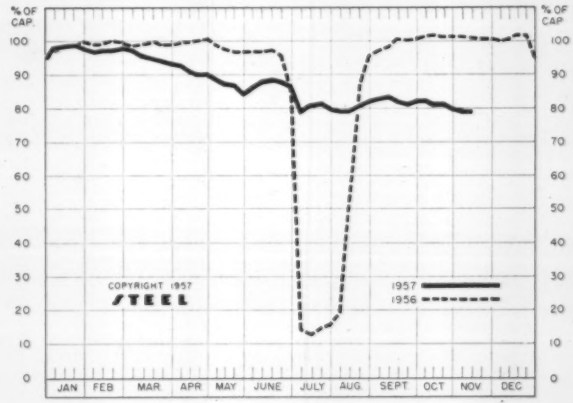
Heavy shipyard needs are expected through next year; but utility work is down; chemical requirements are not nearly so active as they were a year ago; railroad car needs are off.

SCRAP SINKING—Disinterest of consumers has forced scrap prices down again for the twelfth consecutive week. STEEL's composite last week dropped another $2 to $33.33, the lowest since December, 1954.

Except for a reduction of $5 a ton on wide flange beams by Inland Steel Co. to make it competitive with other sellers, there were no significant steel price changes last week. STEEL's composite on finished steel is $146.03.

PRODUCTION—Steelmaking operations last week held steady at 79 per cent. This is equal to output of about 2,021,000 net tons.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of Capacity Engaged)

	Week Ended Nov. 10	Change	Same Week 1956	Same Week 1955
Pittsburgh	81.5	— 1*	101	102
Chicago	80	— 1.5	99.5	99
Mid-Atlantic	83	+ 1	102	97.5
Youngstown	66	0	101	100
Wheeling	71	+ 4	101	99
Cleveland	85.5	— 6*	99	100.5
Buffalo	90	0	107.5	105
Birmingham	67	— 2	95.5	94
New England	50	+ 1	87	91
Cincinnati	80.5	— 6.5*	94	92.5
St. Louis	91	— 1.5	107	96.5
Detroit	95.5	— 2.5*	101	99
Western	91	0	109	100
National Rate	79	0	101	99

INGOT PRODUCTION‡

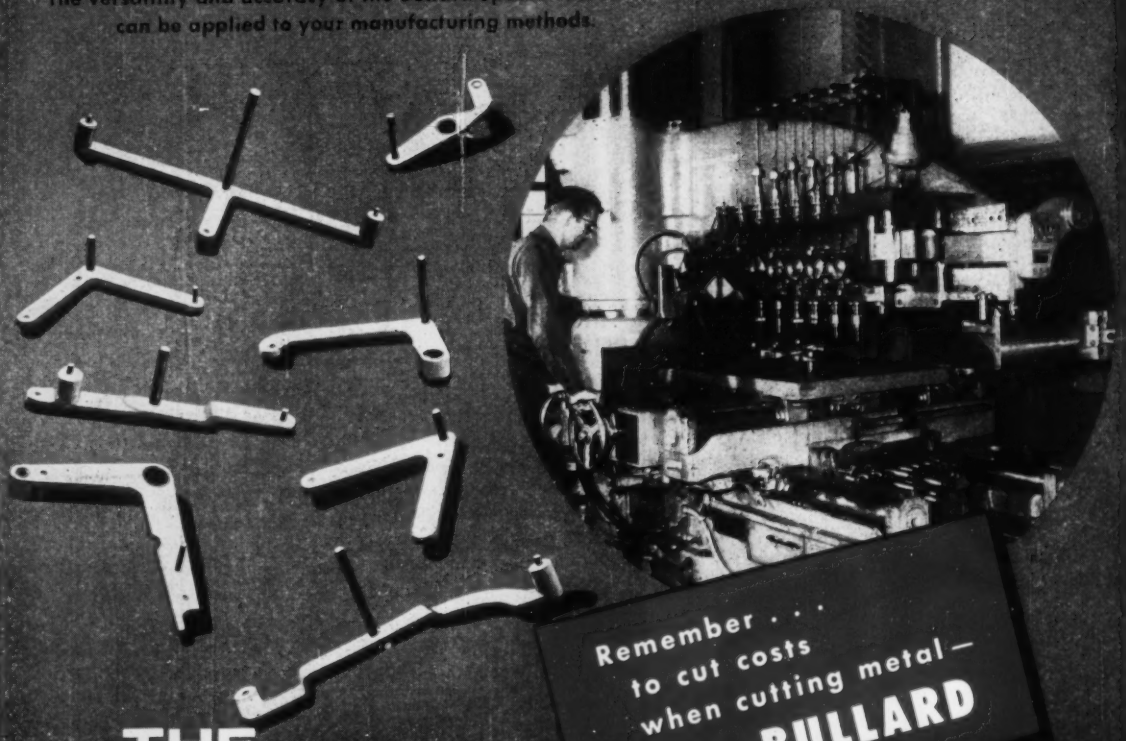
	Week Ended Nov. 10	Week Ago	Month Ago	Year Ago
INDEX (1947-1949=100)	124.4†	127.1	131.0	153.3
NET TONS (In thousands)	2,015†	2,041	2,105	2,463

*Change from preceding week's revised rate. †Estimated. ‡Amer. Iron & Steel Institute. Weekly capacity (net tons): 2,559,490 in 1957; 2,461,893 in 1956; 2,413,278 in 1955.

Metalworking Outlook—Page 53 Technical Outlook—Page 109

. . . AN 8 TO ONE SAVING WITH BULLARD Spacer Table

is obtained by the Daystrom Instrument, Division of Daystrom Incorporated, Archbald, Pa., on drilling and boring various sized holes with diameter tolerances of ±.0002 and center distances of ±.0005. The major part of this saving is due to eliminating the necessity of making costly drill jigs and boring fixtures for each individual piece or operation. The multiple drill head, with variable speed drive, at Daystrom Instrument, is set up to drill and bore three different diameters on as many as fourteen holes in one set-up. The versatility and accuracy of the Bullard Spacer Table can be applied to your manufacturing methods.



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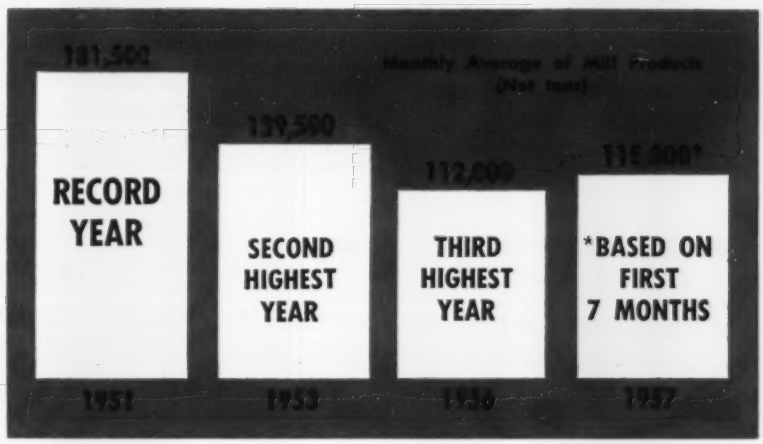
BRIDGEPORT 9, CONNECTICUT

Steel Imports Aren't Breaking Records, But They Still Pain Domestic Producers



Foreign barbed wire sells for as much as $3 a spool less than the U. S. product; fencing is $20 a ton cheaper; and nails are $30 a ton under the domestic price

IMPORTS of steel are declining, but domestic producers who have been hurt the most feel little or no relief.

Reason: Wire mill products—more specifically, the merchant items—continue to cause a lot of headaches.

The decline in principal imports chiefly concerns structurals and tubular goods. Since demand for them was heavy in the domestic market, they weren't much of a competitive factor. Their tonnages were small, compared with domestic production.

Small but Mighty—Imports of steel mill products are equal to only 1.5 or 2 per cent of U. S. production. But competition depends upon the product and the geographic area it is concentrated in.

Steel mill products imported in the first seven months of this year totaled 804,735 net tons. U. S. mill shipments totaled 50,162,861 tons.

In contrast, barbed wire imports (38,297 net tons) were equivalent to 83 per cent of U. S. mill shipments of that product. Nail imports (75,975 tons) were equal to 26 per cent of U. S. mill shipments, and fence imports (16,611 tons) were equal to 10 per cent of U. S. mill shipments.

Flooded—Eighty-seven per cent of the barbed wire imports landed at East Coast and Gulf Coast ports; so did 56 per cent of the nails and 74 per cent of the fence.

They continued the squeeze on wire mills in the eastern and southeastern part of the U. S. In 1956, Atlantic and Gulf Coast ports received 91 per cent of the barbed wire imports, 63 per cent of the nail imports, and 80 per cent of the fence imports.

Concentrated—Imports of reinforcing bars in the first seven months of 1957 were only 7.5 per cent as large as U. S. mill shipments of them. Their entry was concentrated in Florida. Of the 114,169 net tons of them, 52,176 (46 per cent) arrived at the Sunshine State's ports. The other two main entry points for RE bars were Galveston, Tex., (34,146 tons), and Los Angeles (2893 tons).

No. 1 Port—Galveston received more tonnage of steel mill product imports in the first seven months of this year than any other port. Arriving there were 174,990 net tons—21 per cent of the total imports of 804,735 tons. It also led in another category: It received more structurals than any other port in the first seven months. Imports of structurals at all the ports totaled 259,146 tons, equivalent to 6 per cent of the amount shipped from U. S. mills. Structural imports slipped from 50,776 net tons in January to 17,976 tons in July, reflecting the catching up of supply with demand.

Main Exporters—Principal shippers of steel mill products to the U. S. in the first seven months were Belgium and Luxembourg. They accounted for 346,611 net tons (43 per cent). Next was France with 140,957 tons (17 per cent). Third was West Germany with 132,372 tons (16 per cent). Japan supplied only 13,159 tons (1.6 per cent).

The squeeze on wire mills in the Southeast has forced their wire operations down to 60 per cent or less of capacity. On merchant wire products, the situation is even worse. One producer who has a capacity of around 2000 tons of barbed wire a month received orders for only 23 tons in the first three weeks of October.

Skimming the Cream—The bulk of the imports are the common, easy-to-make products. The business that's left for the domestic producers is in harder-to-make and specialty products.

The reason imports continue to come in is that they are priced lower than their domestic counterparts. Eighty-seven-pound spools of foreign barbed wire have been selling for as much as $3 a spool less than the domestic product in some South Atlantic and Gulf Coast ports. Imported fencing has been averaging at least $20 a ton less than the American-made product. Imported nails are as much as $30 a ton less than domestic nails. U. S. producers report that the imported items are of good quality.

Low-Cost Labor — Low labor rates in foreign mills account for much of the price differentials. In Western Germany, the average steelworker gets 65 cents an hour for a 48-hour week. A skilled

German steelworker receives 75 cents an hour. In the U. S., the minimum wage for steelworkers is $1.89 an hour. The average hourly wage paid is around $3.

One of the things that has put foreign mills into a strong position to compete with American mills is the U. S. government's postwar foreign aid program. Millions of U. S. dollars (in low-interest loans and outright gifts) have gone into the rehabilitation of Western Europe's war-ravaged steel mills. These rebuilt plants are modern and efficient.

What To Do?—U. S. mills are perplexed. Some of them with merchant wire products equipment have barely enough business to keep it going, but they are reluctant to scrap it. They like to have as complete a product line as possible, and they don't think the nation should become dependent upon foreign producers.

The Solution? — One company hurt by the imports says: "If somehow we could get the foreign countries up into a position where they would need all of their own steel, they wouldn't be shipping it into the U. S."

Imported Bars Easier

A slight easing is noted in prices on deformed bars imported from Europe. Other major items are steady, but easy, with no buying pressure evident in any product.

Deformed bars are lower at $6.28 per 100 lb, landed, duty paid, North Atlantic ports; $6.23, South Atlantic and Gulf ports; and $6.48, West Coast.

Steel Bars . . .

Bar Prices, Page 170

With mill deliveries easy, hot carbon bar consumers continue to cover on a nearby basis, and, in most cases, at a level not comparable with their consumption. Some fastener makers, for instance, have reduced stocks to 30-day requirements, compared with 60 to 90 days normally These manufacturers are operating at 60 to 65 per cent of capacity, but still their stocks are relatively light.

Consumers indicate there will be no change in their present conservative buying policy until there is some upturn in demand for their products.

A Pittsburgh producer calls the cold drawn bar market "dull," but points out that there were no order cancellations for November, indicating inventories are getting low.

Alloy bars are moving slowly. But makers of plow blades are increasing their purchases. Strong demand from this sector through the first quarter next year is seen.

Stainless Steel . . .

Stainless Steel Prices, Page 174

Demand for stainless is picking up with the introduction of 1958 automobiles, E. J. Hanley, president, Allegheny Ludlum Steel Corp., Pittsburgh, said in San Francisco recently. Silicon steels in the lower grades are also experiencing a pickup.

Production of stainless and heat resisting steel ingots in the third quarter this year totaled 221,260

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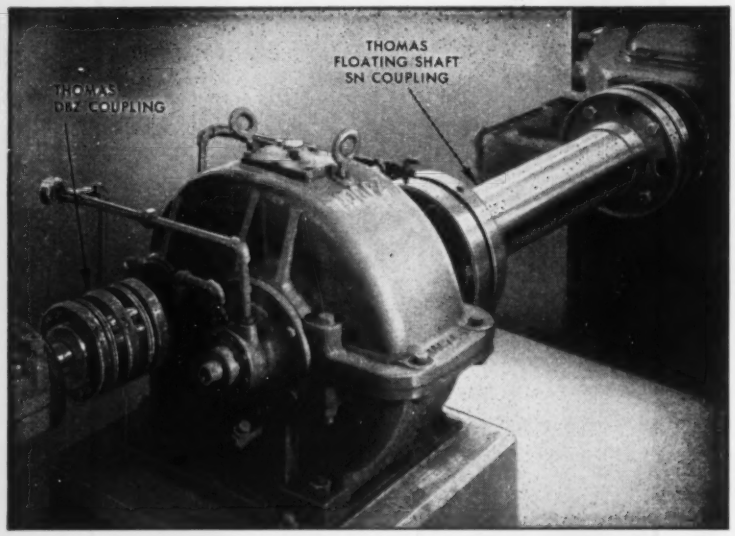

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net tons, reports the American Iron & Steel Institute. This compares with output of 249,470 tons in the second quarter, and with 235,455 tons in the third quarter a year ago.

Cumulative output in the first nine months this year was 793,-733 net tons, compared with 849,-746 in the like period of 1956.

Tool Steel . . .

Tool Steel Prices, Page 174

Shipments of high speed and tool steel (excluding hollow drill steel) totaled 7915 net tons in September after deducting 202 tons shipped for conversion or resale, reports the American Iron & Steel Institute. This compares with 7479 tons in August, and with 9426 tons in September, 1956.

Cumulative shipments this year through September amounted to 77,511 net tons, against 96,515 in the like period last year.

Tin Plate . . .

Tin Plate Prices, Page 172

Tin plate sales are declining. The normal seasonal drop is being accentuated by a determined effort of consumers to trim heavy stocks which resulted when crops failed to meet expectations.

The slump in buying is thought likely to hold through this quarter. Improvement in demand is expected shortly after the turn of the year.

Plates . . .

Plate Prices, Page 170

Platemakers are beginning to open their order books for first quarter, 1958. On heavy sheared plate, they will enter the period with backlogs averaging about a month's production. On light sheared plate, universal and strip plate, though, the story is different. Supply is more than adequate, especially in the universal and strip grades.

One of the softest spots demandwise is the car building industry. The car builders, it is said, have plenty of tonnage for current requirements and see little ahead in the way of new car work.

Heavy inquiry for sheared plates has leveled off, following the easing in strip-plate and universal plate in recent weeks. One large producer is still well behind on commitments on heavy plates, and another will enter the new year with a carryover of at least three to four weeks. Still another would be well behind had it not reduced acceptances for September and October.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 171 & 172

Sheet buyers, including the auto industry, are still reluctant to place forward orders.

The producers of cold-rolled sheets no longer anticipate a sharp upswing in activity this quarter. Demand is shrinking in some areas of the market; manufacturers of office furniture, for example, are trimming purchases in line with the general tendency to lower inventories. They had been taking relatively large tonnages.

At best, demand is spotty. Needs of container manufacturers, stovemakers, and converters are hold-

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Anti-friction bearings used throughout. Oversized roller bearings (double row) used in main truck wheels.

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*In any crane, these are the parts that handle the heavy work . . . the parts that *must be* top quality if you're looking for crane *dependability.* Compare Cranemaster engineering at these critical points with any industrial shop crane. Then compare prices. Time and time again Abell-Howe proves it has the top value in overhead traveling cranes . . . in capacities to 20 tons—spans to 60 feet.

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ing up fairly well, but light tankwork and building trade requirements are off seasonally, and the warehouses are specifying smaller tonnages.

Auto builders appear to be concentrating on orders for "spot tonnages" rather than maintaining a steady, unbroken demand. So sheet mills have only moderate orders on books for December and few orders for January shipment.

Gains are predicted for automotive orders in the first quarter. By that time, public reception of the 1958 model cars will be clearly defined. Even though auto sales should fail to meet expectations, the threat of a strike in the industry next summer will probably spur production in the first half. Heavy sheet ordering should result.

Republic Steel is reviving its production of terne plate. It has completed a continuous terne line at its Warren, Ohio, plant.

Rails, Cars . . .

Track Material Prices, Page 173

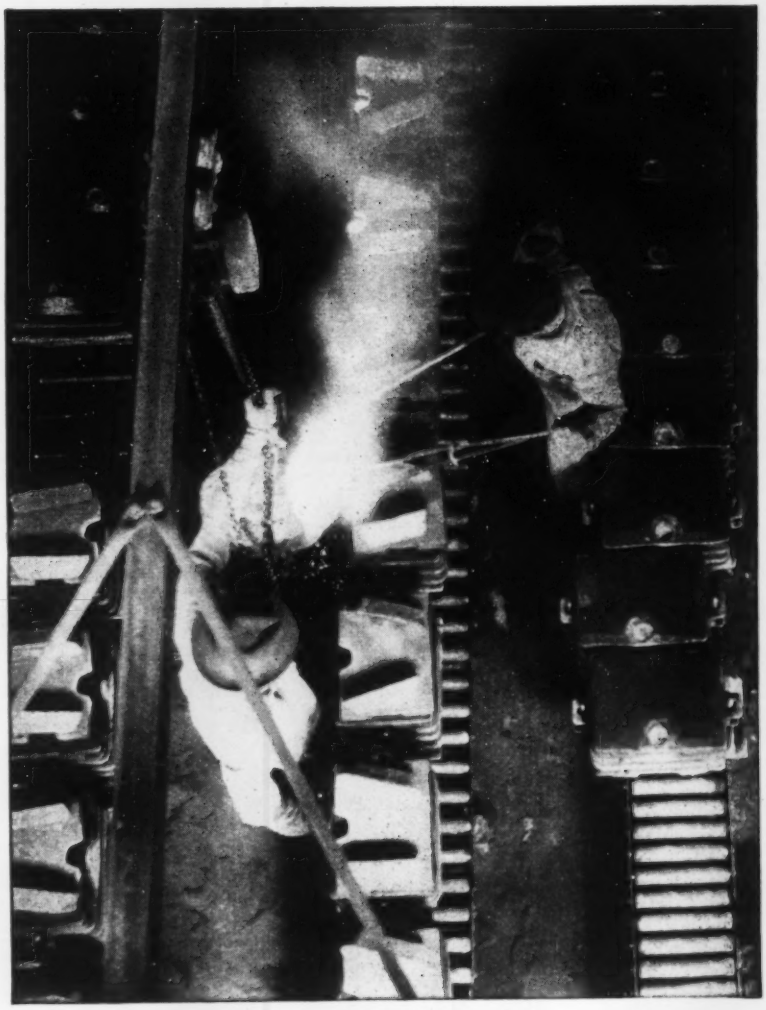
Normally, some fairly sizable rail tonnages come out for bidding in the East about this time of year. Currently, though, demand is nil. Also, there are no indications of important inquiries being issued in the immediate future. One railroad is considering tentatively the purchase of a modest tonnage, although it still has rails on hand bought two years ago.

Tubular Goods . . .

Tubular Goods Prices, Page 174

Pipe sellers are concentrating on plans for 1958 sales. Many have about abandoned hope of an upswing in demand over the remainder of this year. Plumbing and heating industry requirements are dropping seasonally—fourth quarter demand is slower than it has been in recent years.

Some producers of oil country tubular goods are operating at levels in excess of demand. They're taking advantage of the decline in sales of carbon tubular products to build up their supplies at distributing points in the Southwest. Conditions are expected to be highly competitive in oil country goods in the first quarter next year; sellers in position to provide supplies



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heat treated, have tensile strength as high as 120,000 psi with correspondingly high yield strength.

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quickly (and in the sizes and tonnages required) will get the business. Stronger demand is anticipated in the second quarter.

Electricweld pipe in four standard sizes between 6⅝ in. and 12¾ in. OD, is now being offered by Jones & Laughlin Steel Corp., Pittsburgh. It can be produced in lengths up to 60 ft.

Warehouse . . .

Warehouse Prices, Page 175

Bookings by distributors are fair, consisting principally of quantities considered small, even when measured by jobbing standards. Buyers are taking tonnages mainly for immediate needs. No substantial improvement is expected through the fourth quarter.

Several smaller warehouses in the Pittsburgh district are expanding their services in distributing such products as roofing and strapping. It is being done in an effort to make up for lagging sales of flat-rolled steel products.

November sales of several items, including sheets, bars and pipe, have fallen below October levels, and October was considered a dull sales month. Demand for such products as plates and standard shapes has slipped.

Pig Iron . . .

Pig Iron Prices, Page 175

Most merchant pig iron sellers expect a slight decline in November and December business. They see indications of additional easing in foundry operations over the remainder of the year. Foundries are making no effort to replenish raw material stocks, reduced substantially in recent months, especially in October. Frequently, shipping orders carry a "rush" tag, indicating new orders closely parallel consumption.

Foundries which make castings for the appliance and automotive industries are operating well below capacity. A decline in house construction starts has adversely affected demand for castings going into heating equipment.

Due to lessened demand for pig iron from foundries and to curtailment in steelmaking operations, mills are gradually reducing blast furnace operations. Sharon Steel Corp. has taken off a stack at its

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The advertiser can thus tell whether he's getting his money's worth.

The publisher has a better sales story to prospective advertisers because his magazine is "audited."

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Roemer Works, Farrell, Pa., for a two-week relining job. Sharon also has banked its Mary furnace at Lowellville, Ohio. Officals say the company has accumulated an inventory at that point.

Republic Steel Corp. shut down a second small blast furnace at Cleveland, attributing the move to to a drop in merchant iron demand.

Iron Ore . . .

Iron Ore Prices, Page 176

Cleveland-Cliffs Iron Co., Cleveland, representative in the U. S. for the Vale de Rio Doce Co. of Brazil, last week reported that the price of Itabira lump ore (produced by Rio Doce) will hold unchanged through 1958 at $14.60 a gross ton, f.o.b. vessel, Brazilian port of Vitoria, based on 68.5 per cent dried iron.

Any increase in labor cost, rail freight, and forwarding costs in Brazil will be absorbed by Rio Doce. Lowered vessel rates should make delivered prices at eastern seaboard ports lower than those prevailing this year.

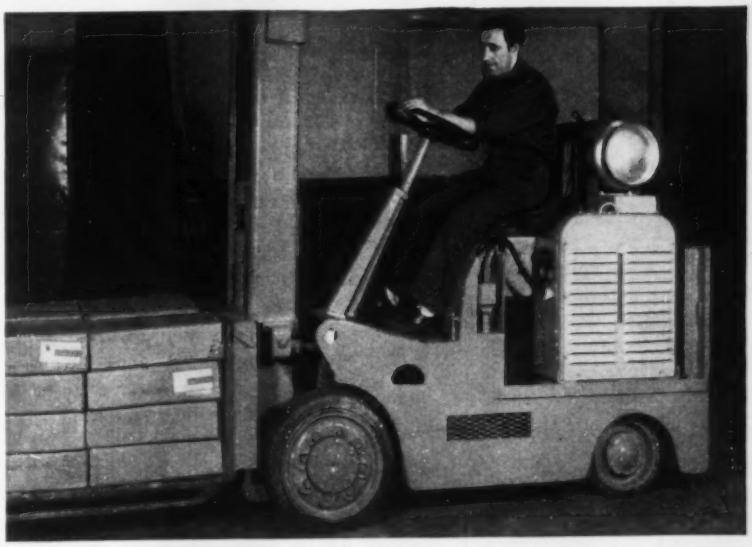
Itabira ore production this year will total about 3 million tons. Well over that is indicated for 1958, half going to the U. S. and Canada, and the other half to Europe and Japan. Rio Doce plans expansion so that 6 million tons can be shipped by 1960-62 yearly.

The Interstate Commerce Commission has authorized the New York Central Railroad to cut its rate 28 cents a ton on carloads of Labrador iron ore shipped from Contre - Coeur, Canada, to the Youngstown area. At the same time, the ICC said railroads shipping similar traffic from Baltimore and Philadelphia must maintain their present rates.

At the beginning of November, at least 40 vessels of the Great Lakes ore fleet of 251 were being laid up or were already in winter quarters.

Shipments of Lake Superior iron ore in the week ended Nov. 4 totaled 2,023,272 gross tons, reports the American Iron Ore Association. In the like week last year, 2,753,374 tons were moved.

Cumulative shipments to Nov. 4 are reported to be 81,384,292 tons, up 12,859,084 tons from the movement in the like 1956 period.



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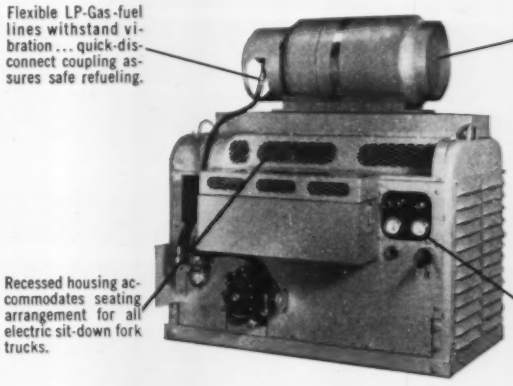
Now, get the advantages of full-time LPG-electric power for *any* electric, sit-down fork truck, regardless of make or model. Compact Ready-Power model HA-3 accommodates all seating arrangements . . . assures remarkably low-cost operation . . . minimizes objectionable fume problems. Compact LP-Gas cylinder is mounted on top of engine-generator housing for quick, easy interchangeability. Hinged cover and side plate give easy access to engine accessories; removable end plate permits service of generator. LP-Gas components are listed by Underwriters' Laboratories and comply with Factory Mutual recommendations. Write today for full information.


Flexible LP-Gas-fuel lines withstand vibration... quick-disconnect coupling assures safe refueling.
LP-Gas cylinder is standard I.C.C. 33½-lb. or 43½-lb. capacity. A.S.M.E. tank is optional.
Recessed housing accommodates seating arrangement for all electric sit-down fork trucks.
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Structural Shapes . . .

Structural Shape Prices, Page 170

Indicative of the easier situation in shapes, one large producer is no longer allocating tonnage ahead. He is accepting about whatever is offered by regular customers. This applies to wide flange sections as well as standard shapes. The move reflects a general reduction in structural activity.

Inland Steel Co. reduced its price on wide flange beams $5 a ton, effective Nov. 1. This brought its published quotation to $5.275 per 100 pounds, f.o.b. Indiana Harbor, Ind.

The company had established a base price on this product on Jan. 1 which was $5 above prices quoted for structural shapes in the Chicago area. The action was taken because the established price did not provide an adequate return on Inland's investment in new facilities for the production of wide flange beams.

An increase of 28 per cent in structural steel tonnage in 1957, compared with that in 1956, has brought supply into balance with demand except for wide flange heavier sections. Even these show definite supply improvement. The mills may be caught up on schedules by yearend.

While bridge tonnage for New York state is heavy, including contracts for over 20,000 tons, building and other engineering estimates are down, educational structures excepted.

More shops are estimating individual projects, including bridges. Inquiries in the East are bringing out twice the number of early 1957 estimates for fabricated structural steel. On a 3300-ton state bridge in Westchester County, N. Y., recently, 18 fabricators indicated their intention of submitting bids.

RAILS, CARS . . .

LOCOMOTIVES PLACED

South African Railways, forty-five, 1320 hp. diesel-electric locomotives, to the General Electric Co., Schenectady, N. Y.

RAILROAD CARS PLACED

Bangor & Aroostook, 150 pulpwood cars, to the Magor Car Corp., Passaic, N. J.

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No red tape! We deliver to any place in North America. Over 10 years of service to more than 2000 North American accounts—as a domestic firm, on domestic terms—with lower costs or better deliveries. Write for "How to be at home with products made abroad" and the address of your local Kurt Orban Company representative.

Prices per 100 lbs. (except where otherwise noted) landed, including customs duty, but no other taxes.

	Atlantic & Gulf Coast	West Coast	Vancouver	Montreal
Deformed Bars (⅝" Dia. incl. all extras)	$6.52	$6.77	$6.64	$6.25
Merchant Bars (¼" Round incl. all extras)...	7.62	7.85	7.48	7.22
Bands (1"x⅛"x20' incl. all extras)	7.76	7.98	7.65	7.38
Angles (2"x2"x¼" incl. all extras)	6.57	6.75	6.99	6.69
Beams & Channels (base)	6.82	7.00	7.24	6.94
Furring Channels (C.R. ⅞", per 1000')	26.62	27.77	....	....
Barbed Wire (per 82 lb. net reel)	6.95	7.40	7.75	7.80
Nails (bright, common, 20d and heavier)	8.38	8.58	9.07	8.99
Larssen Sheet Piling (section II, new, incl. size extra)	7.80	8.10	8.10	7.80
Wire, Manufacturer's bright, low C, (11½ga.)	7.38	7.52	8.52	8.52
Wire, galv., Fence qual., low C, (11½ ga.) ..	8.01	8.15	9.42	9.42
Wire, Merchant quality, bl. ann., (10 ga.)...	7.60	7.75	8.78	8.78
Rope Wire (.045", 247,000 PSI, incl. extras)..	13.60	13.75	13.00	13.00
Wire, fine and weaving, low C, (20 ga.)	10.66	10.80	10.17	12.17
Tie Wire, autom. baler (14½ ASWG, 97 lbs. net)	9.58	9.73	9.64	9.54
Merchant Pipe (½" galv. T & C, per 100')...	8.48	8.83	....	....
Casing (5½", 15.5 J55, T & C, per 100').....	189.00	194.00	....	....
Tubing (2⅞", 6.4 J55, EUE, per 100').....	98.00	99.00	....	....
Forged R Turn. Bars, C-1035 (from 10" dl.).	13.50	13.73	13.50	13.24

Ask prices on: Bulb tees, bolts and nuts, manganese steel plates and shapes, welded wire reinforcing mesh and hardware cloth, boiler tubes, A-335-P11 pressure pipe.

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STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

18,000 tons, towers and anchorages, Throgg Neck suspension bridge, East River, New York, to Bethlehem Steel Co., Bethlehem, Pa.; 11,000 tons, fabricated structural steel for towers and anchorage metal work, and 7000 tons, plain material, foundations for two towers, Merritt-Chapman & Scott Corp., contractor; bid to Triborough Bridge & Tunnel Authority.

4600 tons, nine-story office building, Southern New England Telephone Co., New Haven, Conn., to Topper & Griggs, Hartford, Conn.; Edwin Moss & Son Inc., Bridgeport, Conn., general contractor.

1900 tons, state bridge work, Onondaga County, N. Y., through Bero Construction Co., Waterloo, N. Y., to Phoenix Bridge Co., Phoenixville, Pa.

1450 tons, bridge widening, Connecticut Turnpike, Jewett City, Conn., to City Iron Works, Hartford, Conn.; M. A. Gammino Co., Providence, R. I., and Brunalli Construction Co., Southington, Conn., joint contractors.

1090 tons, state highway structures, Saratoga-Washington counties, New York, Colorado Fuel & Iron Corp., Claymont, Del.; Arthur A. Johnson Corp. and Peter Kewitt & Sons Contracting Co., New York, joint contractor.

630 tons, plant and office building, Inland Container Corp., Franklin Park, Ill., to Indiana Bridge Co., Muncie, Ind.; Batson-Cook Co., West Point, Ga., general contractor; reinforcing bars, Ceco Steel Products Co., Chicago.

630 tons, transmission towers, Long Island Lighting Co., Nassau County and Rocky Point, N. Y., to Lehigh Structural Steel Co., Allentown, Pa.

600 tons, service center, Consumers Power Co., Saginaw, Mich., to Taylor-Gaskin Co., Detroit; Spence Bros., Saginaw, general contractor.

380 tons, research center, Grand Island, N. Y., to Bethlehem Contracting Co., Bethlehem, Pa.; Wigton-Abbott Corp., Newark, N. J., general contractor.

305 tons, office building, Peoples Life Insurance Co., Washington, D. C., to Belmont Iron Works, Philadelphia; Charles H. Thompkins Co., Washington, general contractor; reinforcing bars, Bethlehem Steel Co., Bethlehem, Pa.

300 tons, service center, Brooklyn Gas Co., Brooklyn, N. Y., to Deleson Steel Co., New York.

250 tons, transmission towers, Public Service Electric & Gas Corp., Bergen County, N. J., to Lehigh Structural Steel Co., Allentown, Pa.

200 tons, angles, General Stores Supply Office, Navy, Philadelphia; to Oregon Steel Mills, Portland, Oreg.

190 tons, dormitories, Rhode Island School of Design, Providence, R. I., to Providence Steel & Iron Co., Providence; E. Turgeon Construction Co., Providence, general contractor.

150 tons, school, Grover, Tex., to Joe R. Turner Co., Houston; Farnsworth & Chambers Co. Inc., Houston, general contractor.

115 tons, angles, General Stores Supply Office, Navy, Philadelphia, to Penn Galvanizing Co., Philadelphia.

110 tons, school, Port Neches, Tex., to Capitol Steel & Iron Co., Houston; also 30 tons of reinforcing bars; Farnsworth & Chambers Co. Inc., Houston, general contractor.

105 tons, bridge, New York Central Railroad, Syracuse, N. Y., to the Bethlehem Steel Co., Bethlehem, Pa.

105 tons, bridge, New York Central Railroad, Park Street, Syracuse, N. Y., to Bethlehem Steel Co., Bethlehem, Pa.

STRUCTURAL STEEL PENDING

3350 tons, state highway bridges, Westchester County, N. Y.; Mt. Vernon Construction Co., Mt. Vernon, N. Y., low on general contract.

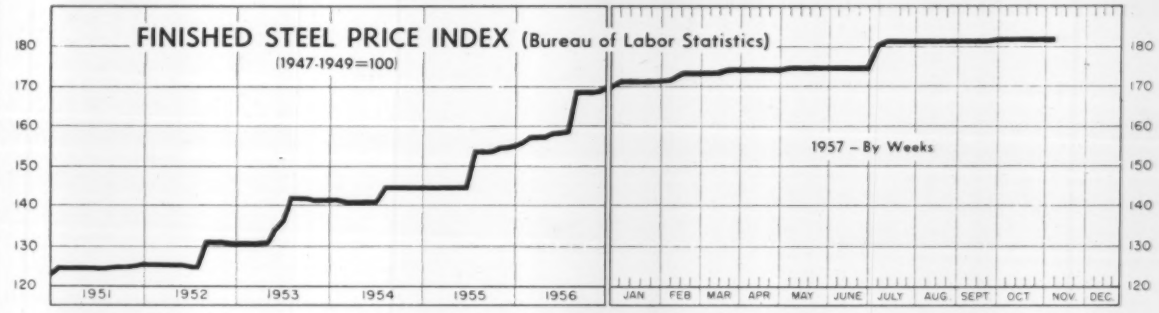
3300 tons, state bridge work, Westchester County, N. Y., Mt. Vernon Contracting Co., Pelham, N. Y., low on general contract.

1500 tons, office building, State Department of Education, Albany, N. Y.; bids Nov 21, Albany, N. Y.

1030 tons, Ferris Booth Hall and dormitory, Columbia University, New York, Lasker-

(*Please turn to Page* 178)

Price Indexes and Composites



Nov. 5, 1957	Week Ago	Month Ago	Oct. Avg.	Year Ago
181.7	181.7	181.7	181.7	168.8

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Nov. 5

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1	$5.600
Rails, Light, 40 lb	7.067
Tie Plates	6.600
Axles, Railway	9.825
Wheels, Freight Car, 33 in. (per wheel)	60.000
Plates, Carbon	6.150
Structural Shapes	5.942
Bars, Tool Steel, Carbon (lb)	0.535
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.650
Bars, Tool Steel, H.R., Alloy, High Speed, W 6.75, Cr 4.5, V2.1, Mo 5.5, C 0.60 (lb)	1.355
Bars, Tool Steel, H.R. Alloy, High Speed, W18, Cr 4, V 1 (lb)	1.850
Bars, H.R., Alloy	10.525
Bars, H.R., Stainless, 303 (lb)	0.525
Bars, H.R., Carbon	6.425
Bars, Reinforcing	6.210
Bars, C.F., Carbon	10.360
Bars, C.F., Alloy	13.875
Bars, C.F., Stainless, 302 (lb)	0.553
Sheets, H.R., Carbon	6.192
Sheets, C.R., Carbon	7.089
Sheets, Galvanized	8.220
Sheets, C.R., Stainless, 302 (lb)	0.688
Sheets, Electrical	12.025
Strip, C.R., Carbon	9.243
Strip, C.R., Stainless, 430 (lb)	0.493
Strip, H.R., Carbon	6.245
Pipe, Black, Buttweld (100 ft)	19.814
Pipe, Galv., Buttweld (100 ft)	23.264
Pipe, Line (100 ft)	199.023
Casing, Oil Well, Carbon (100 ft)	194.499
Casing, Oil Well, Alloy (100 ft)	304.610
Tubes, Boiler (100 ft)	49.130
Tubing, Mechanical, Carbon (100 ft)	24.953
Tubing, Mechanical, Stainless, 304 (100 ft)	205.608
Tin Plate, Hot-dipped, 1.25 lb (95 lb base box)	9.783
Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.483
Black Plate, Canmaking Quality (95 lb base box)	7.583
Wire, Drawn, Carbon	10.225
Wire, Drawn, Stainless, 430 (lb)	0.653
Bale Ties (bundles)	7.967
Nails, Wire, 8d Common	9.828
Wire, Barbed (80-rod spool)	8.719
Woven Wire Fence (20-rod roll)	21.737

STEEL's FINISHED STEEL PRICE INDEX*

	Nov. 6 1957	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg=100)	239.15	239.15	239.15	225.58	181.31
Index in cents per lb	6.479	6.479	6.479	6.111	4.912

STEEL's ARITHMETICAL PRICE COMPOSITES*

Finished Steel, NT	$146.03	$146.03	$146.03	$137.48	$110.98
No. 2 Fdry Pig Iron, GT	66.49	66.49	66.49	62.63	55.04
Basic Pig Iron, GT	65.99	65.99	65.99	62.18	54.66
Malleable Pig Iron, GT	67.27	67.27	67.27	63.41	55.77
Steelmaking Scrap, GT	33.33	35.33	39.50	59.17	43.00

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Nov. 6 1957	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.425	5.425	5.425	5.075	3.95
Bars, H.R., Chicago	5.425	5.425	5.425	5.075	3.95
Bars, H.R., deld., Philadelphia	5.725	5.725	5.725	5.35	4.502
Bars, C.F., Pittsburgh	7.30*	7.30*	7.30*	6.85*	4.925
Shapes, Std., Pittsburgh	5.275	5.275	5.275	5.00	3.85
Shapes, Std., Chicago	5.275	5.275	5.275	5.00	3.85
Shapes, deld., Philadelphia	5.545	5.545	5.545	5.40	4.13
Plates, Pittsburgh	5.10	5.10	5.10	4.85	3.90
Plates, Chicago	5.10	5.10	5.10	4.85	3.90
Plates, Coatesville, Pa.	5.10	5.10	5.50	5.25	4.35
Plates, Sparrows Point, Md.	5.10	5.10	5.10	4.85	3.90
Plates, Claymont, Del.	5.70	5.70	5.70	5.35	4.35
Sheets, H.R., Pittsburgh	4.925	4.925	4.925	4.675	3.775
Sheets, H.R., Chicago	4.925	4.925	4.925	4.675	3.775
Sheets, C.R., Pittsburgh	6.05	6.05	6.05	5.75	4.575
Sheets, C.R., Chicago	6.05	6.05	6.05	5.75	4.575
Sheets, C.R., Detroit	6.05-6.15	6.05-6.15	6.05-6.15	5.75-5.85	4.775
Sheets, Galv., Pittsburgh	6.60	6.60	6.60	6.30	5.075
Strip, H.R., Pittsburgh	4.925	4.925	4.925	4.675	3.75-4.225
Strip, H.R., Chicago	4.925	4.925	4.925	4.675	3.725
Strip, C.R., Pittsburgh	7.15	7.15	7.15	6.85	5.10-5.80
Strip, C.R., Chicago	7.15	7.15	7.15	6.85	5.35
Strip, C.R., Detroit	7.25	7.25	7.25	6.95	5.30-6.05
Wire, Basic, Pittsburgh	7.65	7.65	7.65	7.20	5.10-5.225
Nails, Wire, Pittsburgh	8.95	8.95	8.95	8.20	6.20-6.35
Tin plate (1.50 lb) box, Pitts.	$10.30	$10.30	$10.30	$9.85	$8.95

*Including 0.35c for special quality.

SEMIFINISHED STEEL					
Billets, forging, Pitts. (NT)	$96.00	$96.00	$96.00	$91.50	$70.50
Wire rods, 7/32-5/8" Pitts.	6.15	6.15	6.15	5.80	4.325

PIG IRON, Gross Ton	Nov. 6 1957	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pitts.	$67.00	$67.00	$67.00	$63.50	$55.50
Basic, Valley	66.00	66.00	66.00	62.50	54.50
Basic, deld., Phila.	70.01	70.01	70.01	66.26	59.25
No. 2 Fdry, Neville Island, Pa.	66.50	66.50	66.50	63.00	55.00
No. 2 Fdry, Chicago	66.50	66.50	66.50	63.00	55.00
No. 2 Fdry, deld., Phila.	70.51	70.51	70.51	66.76	59.75
No. 2 Fdry, Birm.	62.50	62.50	62.50	59.00	51.38
No. 2 Fdry (Birm.) deld. Cin.	70.20	70.20	70.20	66.70	58.93
Malleable, Valley	66.50	66.50	66.50	63.00	55.00
Malleable, Chicago	66.50	66.50	66.50	63.00	55.00
Ferromanganese, Duquesne	245.00†	245.00†	245.00†	235.00†	228.00*

†74-76% Mn, net ton. *75-82% Mn, gross ton, Etna, Pa.

SCRAP, Gross Ton (Including broker's commission)					
No. 1 Heavy Melt, Pittsburgh	$31.50	$35.50	$40.50	$58.50	$44.00
No. 1 Heavy Melt., E. Pa.	35.50	36.50	38.50	58.00	41.50
No. 1 Heavy Melt, Chicago	33.00	34.00	39.50	61.00	42.50
No. 1 Heavy Melt, Valley	32.50	33.50	38.50	66.50	44.00
No. 1 Heavy Melt, Cleve.	29.50	30.50	36.50	65.00	43.00
No. 1 Heavy Melt, Buffalo	32.50	36.50	38.50	57.50	43.00
Rails, Rerolling, Chicago	48.50	49.50	57.50	87.50	52.50
No. 1 Cast, Chicago	35.50	35.50	38.50	50.50	50.00

COKE, Net Ton					
Beehive, Furn., Connlsvl.	$15.25	$15.25	$15.25	$14.50	$14.75
Beehive, Fdry., Connlsvl.	18.25	18.25	18.25	17.50	17.00

Steel Prices

Mill prices as reported to STEEL, Nov. 6, cents per pound except as otherwise noted. *Changes shown in italics.* Code numbers following mill points indicate producing company. Key to producers, page 171; to footnotes, page 173.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)
Munhall,Pa. U5 .....$73.50

INGOTS, Alloy (NT)
Detroit S41 .....$77.00
Farrell,Pa. S3 .....77.00
Lowellville,O. S3 .....77.00
Midland,Pa. C18 .....77.00
Munhall,Pa. U5 .....77.00
Sharon,Pa. S3 .....77.00

BILLETS, BLOOMS & SLABS
Carbon, Rerolling (NT)
Bessemer,Pa. U5 ....$77.50
Bridgeport,Conn. N19 ..80.50
Buffalo R2 .....77.50
Clairton,Pa. U5 .....77.50
Ensley,Ala. T2 .....77.50
Fairfield,Ala. T2 .....77.50
Fontana,Calif. K1 ....88.00
Gary,Ind. U5 .....77.50
Johnstown,Pa. B2 ....77.50
Lackawanna,N.Y. B2..77.50
Munhall,Pa. U5 .....77.50
S.Chicago,Ill. R2, U5..77.50
S.Duquesne,Pa. U5 ....77.50
Sterling,Ill. N15 .....77.50
Youngstown R2 .....77.50

Carbon, Forging (NT)
Bessemer,Pa. U5 ....$96.00
Bridgeport,Conn. N19..101.00
Buffalo R2 .....96.00
Canton,O. R2 .....98.50
Clairton,Pa. U5 .....96.00
Conshohocken,Pa. A3..101.00
Ensley,Ala. T2 .....96.00
Fairfield,Ala. T2 .....96.00
Fontana,Calif. K1 ..105.50
Gary,Ind. U5 .....96.00
Geneva,Utah C11 .....96.00
Houston S5 .....101.00
Johnstown,Pa. B2 ....96.00
Lackawanna,N.Y. B2..96.00
LosAngeles B3 .....105.50
Midland,Pa. C18 .....96.00
Munhall,Pa. U5 .....96.00
Seattle B3 .....109.50
Sharon,Pa. S3 .....96.00
S.Chicago R2,U5,W14..96.00
S.Duquesne,Pa. U5 ...96.00
S.SanFrancisco B3 ...105.50
Warren,O. C17 .....96.00

Alloy, Forging (NT)
Bethlehem,Pa. B2 ..$114.00
Bridgeport,Conn. N19..114.00
Buffalo R2 .....114.00
Canton,O. R2, T7 ....114.00
Conshohocken,Pa. A3..121.00
Detroit S41 .....114.00
Economy,Pa. B14 ....114.00
Farrell,Pa. S3 .....114.00
Fontana,Calif. K1 ....135.00
Gary,Ind. U5 .....114.00
Houston S5 .....119.00
Ind.Harbor,Ind. Y1 ..114.00
Johnstown,Pa. B2 ...114.00
Lackawanna,N.Y. B2..114.00
LosAngeles B3 .....134.00
Lowellville,O. S3 ....114.00
Massillon,O. R2 ....114.00
Midland,Pa. C18 .....114.00
Munhall,Pa. U5 .....114.00
Sharon,Pa. S3 .....114.00
S.Chicago R2,U5,W14..114.00
S.Duquesne,Pa. U5 ...114.00
Struthers,O. Y1 .....114.00
Warren,O. C17 .....114.00

ROUNDS, SEAMLESS TUBE (NT)
Bridgeport,Conn. N19 $122.50
Buffalo R2 .....117.50
Canton,O. R2 .....120.00
Cleveland,O. R2 .....117.50
Gary,Ind. U5 .....117.50
S.Chicago,Ill. R2, W14 117.50
S.Duquesne,Pa. U5 ...117.50
Warren,O. C17 .....117.50

SKELP
Aliquippa,Pa. J5 ....5.075
Munhall,Pa. U5 .....4.875
Warren,O. R2 .....4.875
Youngstown R2, U5 ..4.875

WIRE RODS
AlabamaCity,Ala. R2 ..6.15
Aliquippa,Pa. J5 .....6.15
Alton,Ill. L1 .....6.35
Buffalo W12 .....6.15
Cleveland A7 .....6.15
Donora,Pa. A7 .....6.15
Fairfield,Ala. T2 .....6.15
Houston S5 .....6.40
IndianaHarbor,Ind. Y1..6.15
Johnstown,Pa. B2 .....6.15
Joliet,Ill. A7 .....6.15
KansasCity,Mo. S5 ....6.40
Kokomo,Ind. C16 .....6.25
LosAngeles B3 .....6.95
Minnequa,Colo. C10 ....6.40
Monessen,Pa. P17 .....6.15
N.Tonawanda,N.Y. B11..6.15
Pittsburg,Calif. C11 ....6.95
Portsmouth,O. P12 .....6.15
Roebling,N.J. R5 .....6.25
S.Chicago,Ill. R2 .....6.15
SparrowsPoint,Md. B2 ..6.25
Sterling,Ill. (1) N15 ....6.15
Sterling,Ill. N15 .....6.25
Struthers,O. Y1 .....6.15
Worcester,Mass. A7 ....6.45

STRUCTURALS

Carbon Steel Std. Shapes
Ala.City,Ala. R2 ....5.275
Atlanta A11 .....5.475
Aliquippa,Pa. J5 ....5.275
Bessemer,Ala. T2 ....5.275
Bethlehem,Pa. B2 ....5.325
Birmingham C15 .....5.275
Clairton,Pa. U5 .....5.275
Fairfield,Ala. T2 .....5.275
Fontana,Calif. K1 ....6.075
Gary,Ind. U5 .....5.275
Geneva,Utah C11 ....5.275
Houston S5 .....5.375
Ind.Harbor,Ind. I-2 ...5.275
Johnstown,Pa. B2 ....5.325
Joliet,Ill. P22 .....5.275
KansasCity,Mo. S5 ....5.375
Lackawanna,N.Y. B2..5.325
LosAngeles B3 .....5.975
Minnequa,Colo. C10 ...5.575
Munhall,Pa. U5 .....5.275
Niles,Calif. P1 .....5.925
Phoenixville,Pa. P4 ..5.325
Portland,Oreg. O4 ....6.025
Seattle B3 .....6.025
S.Chicago,Ill. U5, W14..5.275
S.SanFrancisco B3 ....5.925
Sterling,Ill. N15 .....5.275
Torrance,Calif. C11 ...5.975
Weirton,W.Va. W6 ....5.275

Wide Flange
Bethlehem,Pa. B2 ....5.325
Clairton,Pa. U5 .....5.275
Fontana,Calif. K1 ....6.225
IndianaHarbor,Ind. I-2 ..5.275
Lackawanna,N.Y. B2..5.325
Munhall,Pa. U5 .....5.275
Phoenixville,Pa. P4 ..5.325
S.Chicago,Ill. U5 .....5.275

Alloy Std. Shapes
Aliquippa,Pa. J5 .....6.55
Clairton,Pa. U5 .....6.55
Gary,Ind. U5 .....6.55
Houston S5 .....6.65
KansasCity,Mo. S5 ....6.65
Munhall,Pa. U5 .....6.55
S.Chicago,Ill. U5 .....6.55

H.S., L.A. Std. Shapes
Aliquippa,Pa. J5 .....7.75
Bessemer,Ala. T2 .....7.75
Bethlehem,Pa. B2 .....7.80
Clairton,Pa. U5 .....7.75
Fairfield,Ala. T2 .....7.75
Fontana,Calif. K1 ....8.55
Gary,Ind. U5 .....7.75
Geneva,Utah C11 .....7.75
Houston S5 .....7.85
Ind.Harbor,Ind. I-2, Y1 7.75
Johnstown,Pa. B2 .....7.80
KansasCity,Mo. S5 ....7.85
Lackawanna,N.Y. B2 ..7.80
LosAngeles B3 .....8.45
Munhall,Pa. U5 .....7.75
Seattle B3 .....8.50
S.Chicago,Ill. U5, W14..7.75
S.SanFrancisco B3 ....8.40
Struthers,O. Y1 .....7.75

H.S., L.A. Wide Flange
Bethlehem,Pa. B2 .....7.80
Lackawanna,N.Y. B2 ..7.80
Munhall,Pa. U5 .....7.75
S.Chicago,Ill. U5 .....7.75

PILING

BEARING PILES
Bethlehem,Pa. B2 ....5.325
Lackawanna,N.Y. B2..5.325
Munhall,Pa. U5 .....5.275
S.Chicago,Ill. U5 .....5.275

STEEL SHEET PILING
Lackawanna,N.Y. B2 ..6.225
Munhall,Pa. U5 .....6.225
S.Chicago,Ill. U5 .....6.225

PLATES

PLATES, Carbon Steel
Ala.City,Ala. R2 .....5.10
Aliquippa,Pa. J5 .....5.10
Ashland,Ky. (15) A10 ..5.10
Bessemer,Ala. T2 .....5.10
Clairton,Pa. U5 .....5.10
Claymont,Del. C22 .....5.10
Cleveland J5, R2 .....5.20
Coatesville,Pa. L7 .....5.10
Conshohocken,Pa. A3 ..5.20
Ecorse,Mich. G5 .....5.20
Fairfield,Ala. T2 .....5.10
Fontana,Calif. (20) K1 ..5.90
Gary,Ind. U5 .....5.10
Geneva,Utah C11 .....5.10
GraniteCity,Ill. G4 .....5.30
Harrisburg,Pa. P4 .....5.80
Houston S5 .....5.20
Ind.Harbor,Ind. I-2, Y1..5.10
Johnstown,Pa. B2 .....5.10
Lackawanna,N.Y. B2 ..5.10
LoneStar,Tex. L6 .....5.45
Mansfield,O. E6 .....5.10
Minnequa,Colo. C10 ....5.95
Munhall,Pa. U5 .....5.10
Newport,Ky. A2 .....5.10
Pittsburgh J5 .....5.10
Riverdale,Ill. A1 .....5.10
Seattle B3 .....6.00
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. U5, W14 5.10
SparrowsPoint,Md. B2 ..5.10
Sterling,Ill. N15 .....5.10
Steubenville,O. W10 ....5.10
Warren,O. R2 .....5.10
Youngstown R2, U5, Y1..5.10

PLATES, Carbon Abras. Resist.
Claymont,Del. C22 .....6.75
Fontana,Calif. K1 .....7.55
Geneva,Utah C11 .....6.75
Houston S5 .....6.85
Johnstown,Pa. B2 .....6.75
SparrowsPoint,Md. B2 ..6.75

PLATES, Wrought Iron
Economy,Pa. B14 .....13.15

PLATES, H.S., L.A.
Aliquippa,Pa. J5 .....7.625
Bessemer,Ala. T2 .....7.625
Clairton,Pa. U5 .....7.625
Claymont,Del. C22 .....7.625
Cleveland J5, R2 .....7.625
Coatesville,Pa. L7 .....7.925
Conshohocken,Pa. A3 ..7.625
Economy,Pa. B14 .....7.625
Ecorse,Mich. G5 .....7.725
Fairfield,Ala. T2 .....7.625
Farrell,Pa. S3 .....7.625
Fontana,Calif.(30) K1 ..8.425
Gary,Ind. U5 .....7.625
Geneva,Utah C11 .....7.625
Houston S5 .....7.725
Ind.Harbor,Ind. I-2, Y1 7.625
Johnstown,Pa. B2 .....7.625
Munhall,Pa. U5 .....7.625
Pittsburgh J5 .....7.625
Seattle B3 .....8.525
Sharon,Pa. S3 .....7.625
S.Chicago,Ill. U5, W14 7.625
SparrowsPoint,Md. B2..7.625
Warren,O. R2 .....7.625
Youngstown U5 .....7.625

PLATES, ALLOY
Aliquippa,Pa. J5 .....7.20
Claymont,Del. C22 .....7.20
Coatesville,Pa. L7 .....7.20
Economy,Pa. B14 .....7.20
Farrell,Pa. S3 .....7.20
Fontana,Calif.(30) K1 ..8.00
Gary,Ind. U5 .....7.20
Houston S5 .....7.30
Ind.Harbor,Ind. Y1 .....7.20
Johnstown,Pa. B2 .....7.20
Lowellville,O. S3 .....7.20
Munhall,Pa. U5 .....7.20
Newport,Ky. A2 .....7.20
Pittsburgh J5 .....7.20
Seattle B3 .....8.10
Sharon,Pa. S3 .....7.20
S.Chicago,Ill. U5, W14..7.20
SparrowsPoint,Md. B2..7.20
Youngstown Y1 .....7.20

FLOOR PLATES
Cleveland J5 .....6.175
Conshohocken,Pa. A3 ..6.175
Ind.Harbor,Ind. I-2....6.175
Munhall,Pa. U5 .....6.175
S.Chicago,Ill. U5 .....6.175

PLATES, Ingot Iron
Ashland c.l. (15) A10..5.35
Ashland l.c.l. (15) A10..5.85
Cleveland c.l. R2 .....5.85
Warren,O. c.l. R2 .....5.85

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)
Ala.City,Ala.(9) R2 ..5.425
Aliquippa,Pa.(9) J5 ..5.425
Alton,Ill. L1 .....5.625
Atlanta(9) A11 .....5.625
Bessemer,Ala.(9) T2 ..5.425
Birmingham(9) C15 ..5.425
Bridgeport,Conn.(9) N19 5.65
Buffalo(9) R2 .....5.425
Clairton,Pa. (9) U5....5.425
Cleveland(9) R2 .....5.425
Ecorse,Mich.(9) G5....5.525
Emeryville,Calif. J7 ..6.175
Fairfield,Ala.(9) T2 ..5.425
Fairless,Pa. (9) U5...5.575
Fontana,Calif.(9) K1 ..6.125
Gary,Ind.(9) U5 .....5.425
Houston(9) S5 .....5.675
Ind.Harbor(9) I-2, Y1 5.425
Johnstown,Pa.(9) B2 ..5.425
Joliet,Ill. P22 .....5.425
KansasCity,Mo.(9) S5..5.675
Lackawanna(9) B2 ....5.425
LosAngeles(9) B3 .....6.125
Milton,Pa. M18 .....5.575
Minnequa,Colo. C10 ...5.875
Niles,Calif. P1 .....6.125
N.T'wanda,N.Y.(46)B11 5.775
Pittsburg,Calif.(9) C11..6.125
Pittsburgh(9) J5 .....5.425
Portland,Oreg. O4 ....6.175
Seattle B3, N14 .....6.175
S.Ch'c'go(9)R2,U5,W14 5.425
S.Duquesne,Pa.(9) U5..5.425
S.SanFran.,Calif.(9)B3 6.175
Sterling,Ill.(1)(9) N15..5.425
Sterling,Ill.(9) N15 ....5.525
Struthers,O. Y1 .....5.425
Tonawanda,N.Y. B12 ..5.425
Torrance,Calif.(9) C11..6.125
Youngstown(9) R2, U5..5.425

BARS, H.R. Leaded Alloy (Including leaded extra)
Warren,O. C17 .....7.475

BARS, Hot-Rolled Alloy
Aliquippa,Pa. J5 .....6.475
Bethlehem,Pa. B2 .....6.475
Bridgeport,Conn. N19 ..6.55
Buffalo R2 .....6.475
Canton,O. R2, T7 ....6.475
Clairton,Pa. U5 .....6.475
Detroit S41 .....6.475
Economy,Pa. B14 .....6.475
Ecorse,Mich. G5 .....6.575
Fairless,Pa. U5 .....6.625
Farrell,Pa. S3 .....6.475
Fontana,Calif. K1 ....7.525
Gary,Ind. U5 .....6.475
Houston S5 .....6.725
Ind.Harbor,Ind. I-2, Y1 6.475
Johnstown,Pa. B2 .....6.475
KansasCity,Mo. S5 ....6.725
Lackawanna,N.Y. B2 ..6.475
Lowellville,O. S3 .....6.475
LosAngeles B3 .....7.525
Massillon,O. R2 .....6.475
Midland,Pa. C18 .....6.475
Pittsburgh J5 .....6.475
Sharon,Pa. S3 .....6.475
S.Chicago R2, U5, W14 6.475
S. Duquesne,Pa. U5....6.475
Struthers,O. Y1 .....6.475
Warren,O. C17 .....6.475
Youngstown U5 .....6.475

BARS & SMALL SHAPES, H.R. High-Strength, Low-Alloy
Aliquippa,Pa. J5 .....7.925
Bessemer,Ala. T2 .....7.925
Bethlehem,Pa. B2 .....7.925
Bridgeport,Conn. N19 ..7.95
Clairton,Pa. U5 .....7.925
Cleveland R2 .....7.925
Ecorse,Mich. G5 .....8.025
Fairfield,Ala. T2 .....7.925
Fontana,Calif. K1 ....8.625
Gary,Ind. U5 .....7.925
Houston S5 .....8.175
Ind.Harbor,Ind. Y1 ....7.925
Johnstown,Pa. B2 .....7.925
KansasCity,Mo. S5 ....8.175
Lackawanna,N.Y. B2..7.925
LosAngeles B3 .....8.625
Pittsburgh J5 .....7.925
Seattle B3 .....8.675
S.Chicago,Ill. U5, W14 7.925
S.Duquesne,Pa. U5 ....7.925
S.SanFrancisco B3 ....8.675
Struthers,O. Y1 .....7.925
Youngstown U5 .....7.925

BAR SIZE ANGLES; H.R. Carbon
Bethlehem,Pa.(9) B2 ..5.575
Houston(9) S5 .....5.675
KansasCity,Mo.(9) S5..5.675
Lackawanna(9) B2 ....5.425
Sterling,Ill. N15 .....5.525
Sterling,Ill.(1) N15 ....5.425
Tonawanda,N.Y. B12 ..5.425

BAR SIZE ANGLES; S. Shapes
Aliquippa,Pa. J5 .....5.425
Atlanta A11 .....5.625
Joliet,Ill. P22 .....5.425
Niles,Calif. P1 .....6.125
Pittsburgh J5 .....5.425
Portland,Oreg. O4 ....6.175
SanFrancisco S7 .....6.275
Seattle B3 .....6.175

BAR SHAPES, Hot-Rolled Alloy
Aliquippa,Pa. J5 .....6.55
Clairton,Pa. U5 .....6.55
Gary,Ind. U5 .....6.55
Houston S5 .....6.80
KansasCity,Mo. S5 ....6.80
Pittsburgh J5 .....6.55
Youngstown U5 .....6.55

BARS, C.F., Leaded Alloy (Including leaded extra)
Ambridge,Pa. W18 ...9.925
BeaverFalls,Pa. M12 ..9.925
Camden,N.J. P13 ....10.10
Chicago W18 .....9.925
Cleveland C20 .....9.925
Elyria,O. W8 .....9.925
LosAngeles P2, S30
(Grade A) 11.30
(Grade B) 11.80
Monaca,Pa. S17 .....9.925
Newark,N.J. W18 ....10.10
SpringCity,Pa. K3 ....10.10
Warren,O. C17 .....9.925

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 .....7.30
BeaverFalls,Pa. M12,R2 7.30
Birmingham C15 .....7.90
Bridgeport,Conn. N19 ..7.65
Buffalo B5 .....7.35
Camden,N.J. P13 .....7.75
Carnegie,Pa. C12 .....7.30
Chicago W18 .....7.30
Cleveland A7, C20 ....7.30
Detroit B5, P17 .....7.50
Detroit S41 .....7.30
Donora,Pa. A7 .....7.30
Elyria,O. W8 .....7.30
FranklinPark,Ill. N5 ...7.30
Gary,Ind. R2 .....7.30
GreenBay,Wis. F7 .....7.30
Hammond,Ind. J5, L2 ..7.30
Hartford,Conn. R2 ....7.80
Harvey,Ill. B5 .....7.30
LosAngeles (49), S30 ..8.75
LosAngeles P2, R2 ....8.75
Mansfield,Mass. B5 ....7.85
Massillon,O. R2, R8 ....7.30
Midland,Pa. C18 .....7.30
Monaca,Pa. S17 .....7.30
Newark,N.J. W18 .....7.75
NewCastle,Pa.(17) B4 ..7.30
Pittsburgh J5 .....7.30
Plymouth,Mich. P5 ....7.55
Putnam,Conn. W18 ....7.85
Readville,Mass. C14 ...7.85
S.Chicago,Ill. W14 ....7.30
SpringCity,Pa. K3 .....7.75
Struthers,O. Y1 .....7.30
Warren,O. C17 .....7.30
Willimantic,Conn. J5 ..7.80
Waukegan,Ill. A7 .....7.30
Youngstown F3, Y1 ....7.30

BARS, Cold-Finished Carbon (Turned and Ground)
Cumberland,Md.(5) C19..6.55

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 ....8.775
BeaverFalls,Pa.M12,R2 8.775
Bethlehem,Pa. B2 .....8.775
Bridgeport,Conn. N19 ..8.925
Buffalo B5 .....8.775
Camden,N.J. P13 .....8.95
Canton,O. T7 .....8.775
Carnegie,Pa. C12 .....8.775
Chicago W18 .....8.775
Cleveland A7, C20 ....8.775
Detroit B5, P17 .....8.975
Detroit S41 .....8.775
Donora,Pa. A7 .....8.775
Elyria,O. W8 .....8.775
FranklinPark,Ill. N5 ..8.775
Gary,Ind. R2 .....8.775
GreenBay,Wis. F7 .....8.775
Hammond,Ind. J5, L2 ..8.775
Hartford,Conn. R2 ....9.075
Harvey,Ill. B5 .....8.775
Lackawanna,N.Y. B2 ..8.775
LosAngeles P2 .....10.65
LosAngeles S30 .....10.75
Mansfield,Mass. B5 ...9.075
Massillon,O. R2, R8 ..8.775
Midland,Pa. C18 .....8.775
Monaca,Pa. S17 .....8.775
Newark,N.J. W18 .....8.95
Plymouth,Mich. P5 ...8.975
S.Chicago W14 .....8.775
SpringCity,Pa. K3 ....8.95
Struthers,O. Y1 .....8.775
Warren,O. C17 .....8.775
Waukegan,Ill. A7 .....8.775
Worcester,Mass. A7....9.075
Youngstown F3, Y1 ..8.775

BARS, Reinforcing (To Fabricators)

Ala.City,Ala. R2 .....5.425
Atlanta A11 .....5.625
Birmingham C15, S42 5.425
Bridgeport,Conn. N19 ...5.65
Buffalo R2 .....5.425
Cleveland R2 .....5.425
Ecorse,Mich. G5 .....5.775
Emeryville,Calif. J7 ..6.175
Fairfield,Ala. T2 .....5.425
Fairless,Pa. U5 .....5.575
Fontana,Calif. K1 ....6.125
Ft.Worth,Tex.(4)(26)T4 5.875
Gary, Ind. U5 .....5.425
Houston S5 .....5.675
Ind.Harbor,Ind. I-2,Y1 5.425
Johnstown,Pa. B2 ....5.425
Joliet,Ill. P22 .....5.425
KansasCity,Mo. S5 ....5.675
Lackawanna,N.Y. B2 ..5.425
Los Angeles B3 .....6.125
Milton,Pa. M18 .....5.575
Minnequa,Colo. C10 ...5.875
Niles,Calif. P1 .....6.125
Pittsburg,Calif. C11 ...6.125
Pittsburgh J5 .....5.425
Portland,Oreg. O4 ....6.175
SandSprings,Okla. S5 ..5.925
Seattle B3, N14 .....6.175
S.Chicago,Ill. R2 .....5.425
S.Duquesne,Pa. U5 ....5.425
S.SanFrancisco B3 ....6.175
SparrowsPoint,Md. B2..5.425
Sterling,Ill.(1) N15 ...5.425
Sterling, Ill. N15 .....5.525
Struthers,O. Y1 .....5.425
Tonawanda,N.Y. B12 ...6.00
Torrance,Calif. C11 ....6.125
Youngstown R2, U5 ..5.425

BARS, Reinforcing (Fabricated; to Consumers)

Boston B2 .....7.56
Chicago U8 .....6.91
Cleveland U8 .....6.89
Johnstown,Pa. B2 .....7.08
KansasCity,Mo. S5 .....7.35
Lackawanna,N.Y. B2 ..6.85
Marion,O. P11 .....6.70
Newark,N.J. U8 .....7.55
Philadelphia U8 .....7.38
Pittsburgh J5, U8 ....7.10
Seattle B3, N14 .....7.70
SparrowsPt.,Md. B2 ....7.08
St.Paul U8 .....7.92
Williamsport,Pa. S19 ..7.00

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 14.45
Economy,Pa.(D.R.)B14 18.00
Economy,(Staybolt)B14 18.45

RAIL STEEL BARS

ChicagoHts.(3) C2, I-2.5.325
ChicagoHts.(4)(44) I-2.5.425
ChicagoHts.(4) C2 ....5.425
Ft.Worth,Tex.(26) T4..5.875
Franklin,Pa. (3) F5 ..5.325
Franklin,Pa. (4) F5 ...5.425
JerseyShore,Pa.(3) J8 ..5.30
Marion,O.(3) P11 ....5.325
Tonawanda(3) R12 ....5.325
Tonawanda(4) B12 ....6.00
Williamsport,Pa. (3)S19 5.50

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

Ala.City,Ala. R2 .....4.925
Allenport,Pa. P7 .....4.925
Ashland,Ky.(8) A10 ..4.925
Cleveland J5, R2 .....4.925
Conshohocken,Pa. A3 ..4.975
Detroit(8) M1 .....5.025
Ecorse,Mich. G5 .....5.025
Fairfield,Ala. T2 .....4.925
Fairless,Pa. U5 .....4.975
Fontana,Calif. K1 ....5.825
Gary,Ind. U5 .....4.925
Geneva,Utah C11 .....5.025
GraniteCity,Ill.(8) G4 ..5.125
Ind.Harbor,Ind. I-2, Y1 4.925
Irvin,Pa. U5 .....4.925
Lackawanna,N.Y. B2 ..4.925
Mansfield,O. E6 .....4.925
Munhall,Pa. U5 .....4.925
Newport,Ky.(8) A2 ..4.925
Niles,O. M21, S3 ....4.925
Pittsburg,Calif. C11 ...5.625
Pittsburgh J5 .....4.925
Portsmouth,O. P12 ....4.925
Riverdale,Ill. A1 .....4.925
Sharon,Pa. S3 .....4.925
S.Chicago,Ill. W14 ....4.925
SparrowsPoint,Md. B2..4.925
Steubenville,O. W10 ...4.925
Warren,O. R2 .....4.925
Weirton,W.Va. W6 .....4.925
Youngstown U5, Y1 ..4.925

SHEETS, H.R., (19 Ga. & Lighter)

Niles,O. M21 .....6.05

SHEETS, H.R. Alloy

Gary,Ind. U5 .....8.10
Ind.Harbor,Ind. Y1 ....8.10
Irvin,Pa. U5 .....8.10
Munhall,Pa. U5 .....8.10
Newport,Ky. A2 .....8.10
Youngstown U5, Y1 ....8.10

SHEETS, H.R. (14 Ga. & Heavier) High-Strength, Low-Alloy

Cleveland J5, R2 ....7.275
Conshohocken,Pa. A3 ..7.325
Ecorse,Mich. G5 .....7.375
Fairfield,Ala. T2 .....7.275
Fairless,Pa. U5 .....7.325
Farrel,Pa. S3 .....7.275
Fontana,Calif. K1 .....8.175
Gary,Ind. U5 .....7.275
Ind.Harbor,Ind. I-2, Y1 7.275
Irvin,Pa. U5 .....7.275
Lackawanna (35) B2 ..7.275
Munhall,Pa. U5 .....7.275
Pittsburgh J5 .....7.275
S.Chicago,Ill. U5, W14 7.275
Sharon,Pa. S3 .....7.275
SparrowsPoint(36) B2..7.275
Warren,O. R2 .....7.275
Weirton,W.Va. W6 ....7.275
Youngstown U5, Y1 ..7.275

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ..5.175
Cleveland R2 .....5.675
Warren,O. R2 .....5.675

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....6.80
Middletown,O. A10 ....6.55
Warren,O. R2 .....6.80

SHEETS, Cold-Rolled Steel (Commercial Quality)

AlabamaCity,Ala. R2 ..6.05
Allenport,Pa. P7 .....6.05
Cleveland J5, R2 .....6.05
Conshohocken,Pa. A3 ..6.10
Detroit M1 .....6.05
Ecorse,Mich. G5 .....6.15
Fairfield,Ala. T2 .....6.05
Fairless,Pa. U5 .....6.10
Follansbee,W.Va. F4 ...6.05
Fontana,Calif. K1 ....7.30
Gary,Ind. U5 .....6.05
GraniteCity,Ill. G4 ....6.25
Ind.Harbor,Ind. I-2, Y1 6.05
Irvin,Pa. U5 .....6.05
Lackawanna,N.Y. B2 ..6.05
Mansfield,O. E6 .....6.05
Middletown,O. A10 ....6.05
Newport,Ky. A2 .....6.05
Pittsburg,Calif. C11 ...7.00
Pittsburgh J5 .....6.05
Portsmouth,O. P12 ....6.05
SparrowsPoint,Md. B2 ..6.05
Steubenville,O. W10 ...6.05
Warren,O. R2 .....6.05
Weirton,W.Va. W6 ....6.05
Yorkville,O. W10 .....6.05
Youngstown Y1 .....6.05

SHEETS, Cold-Rolled High-Strength, Low-Alloy

Cleveland J5, R2 ....8.975
Ecorse, Mich. G5 .....9.075
Fairless,Pa. U5 .....9.025
Fontana,Calif. K1 ...10.275
Gary,Ind. U5 .....8.975
IndianaHarbor,Ind. Y1 8.975
Irvin,Pa. U5 .....8.975
Lackawanna (37) B2 ..8.975
Pittsburgh J5 .....8.975
SparrowsPoint (38) B2 8.975
Warren,O. R2 .....8.975
Weirton,W.Va. W6 ....8.975
Youngstown Y1 .....8.975

SHEETS, Culvert	Cu Steel	Cu Fe
Ashland,Ky. A10	.6.95	7.20
Canton,O. R2	....6.95	7.45
Fairfield T2	....6.95	7.20
Gary,Ind. U5	....6.95	7.20
GraniteCity,Ill. G4	7.15	...
Ind.Harbor I-2	...6.95	7.20
Irvin,Pa. U5	....6.95	7.20
Kokomo,Ind. C16	7.05	...
MartinsFry. W10	.6.95	7.20
Pitts.,Calif. C11	..7.70	...
Pittsburgh J5	....6.95	...
SparrowsPt. B2	..6.95	...

SHEETS, Culvert—Pure Iron

Ind.Harbor,Ind. I-2 ....7.20

SHEETS, Galvanized Steel Hot-Dipped

Ala.City,Ala. R2 .....6.60‡
Ashland,Ky. A10 .....6.60†
Canton,O. R2 .....6.60‡
Dover,O. R1 .....6.60†
Fairfield,Ala. T2 .....6.60†
Gary,Ind. U5 .....6.60*
GraniteCity,Ill. G4 ....6.80*
Ind.Harbor,Ind. I-2 ....6.60†
Irvin,Pa. U5 .....6.60*
Kokomo,Ind. C16 .....6.70‡
MartinsFerry,O. W10 ...6.60*
Middletown,O. A10 ....6.60†
Pittsburg,Calif. C11 ...7.35*
Pittsburgh J5 .....6.60†
SparrowsPt.,Md. B2 ...6.60†
Warren,O. R2 .....6.60†
Weirton,W.Va. W6 ....6.60*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Well Casing

Fontana,Calif. K1 ....7.325

SHEETS, Galvanized High-Strength, Low-Alloy

Irvin,Pa. U5 .....9.725
SparrowsPt.(39) B2 ...9.725

SHEETS, Galvannealed Steel

Canton,O. R2 .....7.00
Irvin,Pa. U5 .....7.00

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland,Ky. A10 .....6.85
Middletown,O. A10 ....6.85

SHEETS, Electrogalvanized

Cleveland (28) R2 ....7.425
Niles,O. (28) R2 .....7.425
Weirton,W.Va. W6 ...7.275

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) .9.25
Butler,Pa. A10 (type 2) .9.35

SHEETS, Enameling Iron

Ashland,Ky. A10 .....6.625
Cleveland R2 .....6.625
Gary,Ind. U5 .....6.625
GraniteCity,Ill. G4 ....6.825
Ind.Harbor,Ind. I-2,Y1 6.625
Irvin,Pa. U5 .....6.625
Middletown,O. A10 ....6.625
Niles,O. M21, S3 .....6.625
Youngstown Y1 .....6.625

BLUED STOCK, 29 Gage

Follansbee,W.Va. F4 ...8.65
Ind.Harbor,Ind. I-2 ...8.475
Yorkville,O. W10 .....8.475

SHEETS, Long Terne Steel (Commercial Quality)

BeechBottom,W.Va.W10	7.00
Gary,Ind. U5	7.00
Mansfield,O. E6	7.00
Middletown,O. A10	7.00
Niles,O. M21, S3	7.00
Warren,O. R2	7.00
Weirton,W.Va. W6	7.00

SHEETS, Long Terne, Ingot Iron

Middeltown,O. A10 .....7.40

Key to Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div., Buffalo-Eclipse Corp.
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C7 Cleve.Cold Rolling Mills
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Plant, Wickwire Spencer Steel Div., Colo. Fuel & Iron
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.

D2 Detroit Steel Corp.
D3 Dearborn Div. Sharon Steel Corp.
D4 Disston Div. H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 EasternGas&FuelAssoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
G8 Green River Steel Corp.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins, E., Steel Tube
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M14 McInnes Steel Co.
M16 Md.Fine & Special. Wire
M17 Metal Forming Corp.
M18 Milton Steel Div. Merritt-Chapman&Scott
M21 Mallory-Sharon Titanium Corp.
M22 Mill Strip Products Co.

N1 National Standard Co.
N2 National Supply Co.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelson Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N14 Northwest.SteelRoll.Mill
N15 Northwestern S.&W. Co.
N19 Northeastern Steel Corp.

O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co. Sub. of Barium Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Div. Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.
P24 Phil. Steel & Wire Corp.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R8 Reliance Div.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service
S41 Stainless Steel Div., J&L Steel Corp.
S42 Southern Elec. Steel Co.

T2 Tenn. Coal & Iron Div., U. S. Steel Corp.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Div. Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div., U. S. Steel Corp.
V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Div., H. K. Porter Co. Inc.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 Youngstown Sheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	4.925
Allenport,Pa. P7	4.925
Alton,Ill. L1	5.125
Ashland,Ky.(8) A10	4.925
Atlanta A11	5.125
Bessemer,Ala. T2	4.925
Birmingham C15	4.925
Buffalo (27) R2	4.925
Conshohocken,Pa. A3	4.975
Detroit M1	5.025
Ecorse,Mich. G5	5.025
Fairfield,Ala. T2	4.925
Fontana, Calif. K1	5.825
Gary,Ind. U5	4.925
Ind.Harbor,Ind. I-2, Y1	4.925
Johnstown,Pa. (25) B2	4.925
Lackaw'na,N.Y.(25) B2	4.925
LosAngeles(25) B3	5.675
Minnequa, Colo. C10	6.025
Pittsburg,Calif. C11	5.675
Riverdale,Ill. A1	4.925
SanFrancisco S7	6.35
Seattle(25) B3	6.35
Seattle N14	6.35
Sharon,Pa. S3	4.925
S.SanFrancisco(25) B3	5.675
SparrowsPoint,Md. B2	4.925
Sterling,Ill. (1) N15	4.925
Sterling,Ill. N15	5.025
Torrance,Calif. C11	5.675
Warren,O. R2	4.925
Weirton,W.Va. W6	4.925
Youngstown U5	4.925

STRIP, Hot-Rolled Alloy

Carnegie,Pa. S18	8.10
Farrell,Pa. S3	8.10
Gary,Ind. U5	8.10
Houston S5	8.35
Ind.Harbor,Ind. Y1	8.10
KansasCity,Mo. S5	8.35
LosAngeles B3	9.30
Lowellville,O. S3	8.10
Newport,Ky. A2	8.10
Sharon,Pa. S3	8.10
S.Chicago,Ill. W14	8.10
Youngstown U5, Y1	8.10

STRIP, Hot-Rolled High-Strength, Low-Alloy

Bessemer,Ala. T2	7.325
Conshohocken,Pa. A3	7.325
Ecorse,Mich. G5	7.425
Fairfield,Ala. T2	7.325
Farrell,Pa. S3	7.325
Gary,Ind. U5	7.325
Ind.Harbor,Ind. I-2, Y1	7.325
Lackawanna,N.Y. B2	7.325
LosAngeles(25) B3	8.075
Seattle(25) B3	8.325
Sharon,Pa. S3	7.325
S.Chicago,Ill. W14	7.325
S.SanFrancisco(25) B3	8.075
SparrowsPoint,Md. B2	7.325
Warren,O. R2	7.325
Weirton,W.Va. W6	7.325
Youngstown U5, Y1	7.325

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	5.175
Warren,O. R2	5.675

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6	7.15
Baltimore T6	7.15
Boston T6	7.70
Buffalo S40	7.15
Cleveland A7, J5	7.15
Conshohocken,Pa. A3	7.20
Dearborn,Mich. D3	7.25
Detroit D2, M1, P20	7.25
Dover,O. G6	7.15
Ecorse,Mich. G5	7.25
Evanston,Ill. M22	7.25
Follansbee,W.Va. F4	7.15
Fontana,Calif. K1	9.00
Franklin Park,Ill. T6	7.25
Ind.Harbor,Ind. Y1	7.15
Indianapolis J5	7.30
LosAngeles J5	9.05
LosAngeles C1	9.20
NewBedford,Mass. R10	7.60
NewBritain(10) S15	7.15
NewCastle,Pa. B4, E5	7.15
NewHaven,Conn. D2	7.60
NewKensington,Pa. A6	7.15
Pawtucket,R.I. R3	7.80
Pawtucket,R.I. N8	7.70
Philadelphia(45) P24	7.70
Pittsburgh J5	7.15
Riverdale,Ill. A1	7.25
Rome,N.Y. (32) R6	7.15
Sharon,Pa. S3	7.15
Trenton,N.J. (31) R5	8.60
Wallingford,Conn. W2	7.60
Warren,O. R2, T5	7.15
Weirton,W.Va. W6	7.15
Worcester,Mass. A7	7.70
Youngstown J5, Y1	7.15

STRIP, Cold-Rolled Alloy

Boston T6	15.40
Carnegie,Pa. S18	15.05
Cleveland A7	15.05
Dover,O. G6	15.05
Farrell,Pa. S3	15.05
FranklinPark,Ill. T6	15.05
Harrison,N.J. C18	15.05
Indianapolis J5	15.20
Lowellville,O. S3	15.05
Pawtucket,R.I. N8	15.40
Riverdale,Ill. A1	15.05
Sharon,Pa. S3	15.05
Worcester,Mass. A7	15.35
Youngstown J5	15.05

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7	10.45
Dearborn,Mich. D3	10.60
Dover,O. G6	10.45
Ecorse,Mich. G5	10.55
Farrell,Pa. S3	10.50
Ind.Harbor,Ind. Y1	10.65
Sharon,Pa. S3	10.50
Warren,O. R2	10.45

STRIP, Cold-Finished Spring Steel (Annealed)

	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	9.50	10.70	12.90	15.90	18.85
Boston T6	9.50	10.70	12.90	15.90	18.85
Bristol,Conn. W1	...	10.70	12.90	16.10	19.30
Carnegie,Pa. S18	8.95	10.40	12.60	15.60	....
Cleveland A7	8.95	10.40	12.60	15.60	18.55
Dearborn Mich. D3	9.05	10.50	12.70	....	....
Detroit D2	9.05	10.50	12.70	15.70	....
Dover,O. G6	8.95	10.40	12.60	15.60	18.55
Evanston,Ill. M22	8.95	10.40	12.60	....	....
Fostoria,O. S1	10.05	11.15	13.10	16.10	....
FranklinPark,Ill. T6	9.05	10.40	12.60	15.60	18.55
Harrison,N.J. C18	....	....	12.90	16.10	19.30
Indianapolis J5	9.10	10.55	12.60	15.60	18.55
LosAngeles C1	11.15	12.60	14.80	17.80	....
LosAngeles J5	11.15	12.60	14.80	....	....
NewBritain,Conn.(10) S15	8.95	10.40	12.60	15.60	18.55
NewCastle,Pa. B4, E5	8.95	10.40	12.60	15.60	....
NewHaven,Conn. D2	9.40	10.70	12.90	15.90	....
NewKensington,Pa. A6	8.95	10.40	12.60	15.60	....
NewYork W3	....	10.70	12.90	16.10	19.30
Pawtucket,R.I. N8	9.50	10.70	12.90	15.90	18.85
Riverdale,Ill. A1	9.05	10.40	12.60	15.60	18.55
Rome,N.Y.(32) R6	8.95	10.40	12.60	15.60	18.55
Sharon,Pa. S3	8.95	10.40	12.60	15.60	18.55
Trenton,N.J. R5	....	10.70	12.90	16.10	19.30
Wallingford,Conn. W2	9.40	10.70	12.90	15.90	18.75
Warren,O. T5	8.95	10.40	12.60	15.60	18.55
Worcester,Mass. A7, T6	9.50	10.70	12.90	15.90	18.85
Youngstown J5	8.95	10.40	12.60	15.60	18.55

Spring Steel (Tempered)

	Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol,Conn. W1	18.10	21.95	26.30
Buffalo W12	18.10	....	....
Fostoria,O. S1	18.30	22.15	....
FranklinPark,Ill. T6	18.45	22.30	26.65
Harrison,N.J. C18	18.10	21.95	26.30
NewYork W3	18.10	21.95	26.30
Palmer,Mass. W12	18.10	....	....
Trenton,N.J. R5	18.10	21.95	26.30
Worcester,Mass. A7, T6	18.10	21.95	26.30
Youngstown J5	18.45	22.30	26.65

Weirton,W.Va. W6 ....10.50
Youngstown Y1 .....10.65

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2 .....7.90

STRIP, C.R. Electrogalvanized

Cleveland A7	7.15*
Dover,O. G6	7.15*
Evanston,Ill. M22	7.25*
Riverdale,Ill. A1	7.25*
Warren,O. B9, T5	7.15*
Worcester,Mass. A7	7.70*
Youngstown J5	7.15*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Sharon,Pa. S3 .....7.275

TIGHT COOPERAGE HOOP

Atlanta A11	5.65
Riverdale,Ill. A1	5.50
Sharon,Pa. S3	5.35
Youngstown U5	5.35

SILICON STEEL

H.R.SHEETS(22 Ga.,cut lengths)	Field	Armature	Electric	Motor	Dynamo
BeechBotton,W.Va. W10	....	....	11.80	12.90	13.95
Mansfield,O. E6	9.625	11.10	11.80	12.90	13.95
Newport,Ky. A2	9.625	11.10	11.80	12.90	13.95
Niles,O. M21, S3	9.625	11.10	11.80	12.90	....
Vandergrift,Pa. U5	....	11.10	11.80	12.90	13.95
Warren,O. R2	9.625	11.10	11.80	12.90	....
Zanesville,O. A10	....	11.10	11.80	12.90	13.95
Zanesville,O. A10 (SP Coils)	....	....	11.55	12.65	13.70

C.R. COILS & CUT LENGTHS (22 Ga.) Fully Processed (Semiprocessed ½c lower)

	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	....	11.35	12.05	13.15	14.20
Brackenridge,Pa. A4	....	....	12.05	13.15	14.20
GraniteCity,Ill. G4	9.825*	11.05*	11.75*	12.85*	....
IndianaHarbor,Ind. I-2..	9.625†	10.85*	11.55*	12.65*	....
Mansfield,O. E6	9.625*	11.35	12.05	13.50	14.20
Vandergrift,Pa. U5	9.625*	11.35	12.05	13.15	14.20
Warren,O. R2	9.625*	11.35	12.05	13.15	14.20
Zanesville,O. A10 (FP Coils)	...	11.35	12.05	13.15	14.20

H.R. SHEETS (22Ga., cut lengths)	Transformer Grades T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	15.00	15.55	16.05	17.10
Vandergrift,Pa. U5	14.75	15.55	16.05	17.10
Zanesville,O. A10	15.00	15.55	16.05	17.10

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	....	17.60	19.20	19.70	20.20	....
Butler,Pa. A10	....	....	....	19.20	19.70	20.20	....
Vandergrift,Pa. U5	....	16.60	17.60	19.20	19.70	20.20	15.25**
Warren,O. R2	....	....	....	....	....	....	15.25‡

*Semiprocessed. †Fully processed only. ‡Coils, annealed, semiprocessed ½c lower. **Cut lengths, ¾-cent lower.

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$8.75	$9.00	$9.40
Fairfield,Ala. T2	8.85	9.10	9.50
Fairless,Pa. U5	8.85	9.10	9.50
Fontana,Calif. K1	9.50	9.75	10.15
Gary,Ind. U5	8.75	9.00	9.40
GraniteCity,Ill. G4	8.85	9.10	9.50
IndianaHarbor,Ind. I-2, Y1	8.75	9.00	9.40
Irvin,Pa. U5	8.75	9.00	9.40
Niles,O. R2	8.75	9.00	9.40
Pittsburg,Calif. C11	9.50	9.75	10.15
SparrowsPoint,Md. B2	8.85	9.10	9.50
Weirton,W.Va. W6	8.75	9.00	9.40
Yorkville,O. W10	8.75	9.00	9.40

ELECTROTIN (22-27 Gage; Dollars per 100 lb)

Aliquippa,Pa. J5	7.725	7.925	....
Niles,O. R2	7.725	7.925	8.125

TINPLATE, American	1.25 lb	1.50 lb
Aliquippa,Pa.J5	$10.05	$10.30
Fairfield,Ala.T2	10.15	10.40
Fairless,Pa. U5	10.15	10.40
Fontana,Calif.K1	10.80	11.05
Gary,Ind. U5	10.05	10.30
Irvin,Pa. U5	10.05	10.30
Pitts.,Calif. C11	10.80	11.05
Sp.Pt.,Md. B2	10.15	10.40
Weirton,W.Va.W6	10.05	10.30
Yorkville,O. W10	10.05	10.30

BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$7.85
Fairfield,Ala. T2	7.95
Fairless,Pa. U5	7.95
Fontana,Calif. K1	8.60
Gary,Ind. U5	7.85
GraniteCity,Ill. G4	7.95
Ind.Harbor,Ind. I-2, Y1	7.85
Irvin,Pa. U5	7.85
Niles,O. R2	7.85
Pittsburg,Calif. C11	8.60
SparrowsPoint,Md. B2	7.95
Weirton,W.Va. W6	7.85
Yorkville,O. W10	7.85

HOLLOWARE ENAMELING Black Plate (29 Gage)

Aliquippa,Pa. J5	$7.50
Gary,Ind. U5	7.50
GraniteCity,Ill. G4	7.60
Ind.Harbor,Ind. Y1	7.50
Irvin,Pa. U5	7.50
Yorkville,O. W10	7.50

MANUFACTURING TERNES (Special Coated, Base Box)

Gary,Ind. U5	$9.70
Irvin,Pa. U5	9.70

ROOFING SHORT TERNES (8 lb Coated, Base Box)

Gary,Ind. U5	$11.25

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	7.65
Aliquippa,Pa. J5	7.65
Alton,Ill. L1	7.85
Atlanta A11	7.85
Bartonsville,Ill. K4	7.75
Buffalo W12	7.65
Chicago W13	7.65
Cleveland A7, C20	7.65
Crawfordsville,Ind. M8	7.75
Donora,Pa. A7	7.65
Duluth A7	7.65
Fairfield,Ala. T2	7.65
Fostoria,O.(24) S1	7.75
Houston S5	7.90
Jacksonville,Fla. M8	8.00
Johnstown,Pa. B2	7.65
Joliet,Ill. A7	7.65
KansasCity,Mo. S5	7.90
Kokomo,Ind. C16	7.75
LosAngeles B3	8.60
Minnequa,Colo. C10	7.90
Monessen,Pa. P7, P16	7.65
N.Tonawanda,N.Y. B11	7.65
Palmer,Mass. W12	7.95
Pittsburg,Calif. C11	8.60
Portsmouth,O. P12	7.65
Rankin,Pa. A7	7.65
S.Chicago,Ill. R2	7.65
S.SanFrancisco C10	8.60
SparrowsPoint,Md. B2	7.75
Sterling,Ill.(1) N15	7.65
Sterling,Ill. N15	7.75
Struthers,O. Y1	7.65
Waukegan,Ill. A7	7.65
Worcester,Mass. A7	7.95

WIRE, Gal'd ACSR for Cores

Bartonville,Ill. K4	12.65
Buffalo W12	12.65
Cleveland A7	12.65
Donora,Pa. A7	12.65
Duluth A7	12.65
Johnstown,Pa. B2	12.65
Minnequa,Colo. C10	12.775
Monessen,Pa. P16	12.65
Muncie,Ind. I-7	12.85
New Haven,Conn. A7	12.95
Palmer,Mass. W12	12.95
Pittsburg,Calif. C11	13.45
Portsmouth,O. P12	12.65
Roebling,N.J. R5	12.95
SparrowsPt.,Md. B2	12.75
Struthers,O. Y1	12.65
Trenton,N.J. A7	12.95
Waukegan,Ill. A7	12.65
Worcester,Mass. A7	12.95

WIRE, Upholstery Spring

Aliquippa,Pa. J5	9.30
Alton,Ill. L1	9.50
Buffalo W12	9.30
Cleveland A7	9.30
Donora,Pa. A7	9.30
Duluth A7	9.30
Johnstown,Pa. B2	9.30
KansasCity,Mo. S5	9.55
LosAngeles B3	10.25
Minnequa,Colo. C10	9.50
Monessen,Pa. P7, P16	9.30
NewHaven,Conn. A7	9.60
Palmer,Mass. W12	9.60
Pittsburg,Calif. C11	10.25
Portsmouth,O. P12	9.30
Roebling,N.J. R5	9.60
S.Chicago,Ill. R2	9.30
S.SanFrancisco C10	10.25
SparrowsPt.,Md. B2	9.40
Struthers,O. Y1	9.30
Trenton,N.J. A7	9.60
Waukegan,Ill. A7	9.30
Worcester,Mass. A7	9.60

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5	9.30
Alton,Ill. L1	9.50
Bartonville,Ill. K4	9.40
Buffalo W12	9.30
Cleveland A7	9.30
Donora,Pa. A7	9.30
Duluth A7	9.30
Fostoria,O. S1	9.35
Johnstown,Pa. B2	9.30
KansasCity,Mo. S5	9.55
LosAngeles B3	10.25
Milbury,Mass.(12) N6	9.60
Minnequa,Colo. C10	9.50
Monessen,Pa. P7, P16	9.30
Muncie,Ind. I-7	9.50
Palmer,Mass.(12) W12	9.60
Pittsburg,Calif. C11	10.25
Portsmouth,O. P12	9.30
Roebling,N.J. R5	9.60
S.Chicago,Ill. R2	9.30
S.SanFrancisco C10	10.25
SparrowsPt.,Md. B2	9.40
Struthers,O. Y1	9.30
Trenton,N.J. A7	9.60
Waukegan,Ill. A7	9.30
Worcester,Mass. A7, J4, T6	9.60

WIRE, Fine & Weaving (8" Coils)

Alton,Ill. L1	15.80
Bartonville,Ill. K4	15.70
Buffalo W12	15.60
Chicago W13	15.60
Cleveland A7	15.60
Crawfordsville,Ind. M8	15.70
Fostoria,O. S1	15.60
Houston S5	15.85
Jacksonville,Fla. M8	15.95
Johnstown,Pa. B2	15.60
KansasCity,Mo. S5	15.85
Kokomo,Ind. C16	15.60
Minnequa,Colo. C10	15.85
Monessen,Pa. P7, P16	15.60
Muncie,Ind. I-7	15.80
Palmer,Mass. W12	15.90
S.SanFrancisco C10	16.45
Waukegan,Ill. A7	15.60
Worcester,Mass. A7, T6	15.90

ROPE WIRE

Bartonville,Ill. K4	12.75
Buffalo W12	12.75
Fostoria,O. S1	12.75
Johnstown,Pa. B2	12.75
Monessen,Pa. P7	12.75
Muncie,Ind. I-7	12.95
Palmer,Mass. W12	13.05
Portsmouth,O. P12	12.75
Roebling,N.J. R5	13.05
SparrowsPt.,Md. B2	12.85
Struthers,O. Y1	12.75
Worcester,Mass. J4	13.05

(A) Plow and Mild Plow; add 0.25c for Improved Plow

WIRE, Tire Bead

Bartonville,Ill. K4	....16.55
Monessen,Pa. P16	....16.55
Roebling,N.J. R5	.....17.05

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	.....11.65
Baltimore T6	.....11.95
Boston T6	.....11.95
Buffalo W12	.....11.65
Chicago W13	.....11.75
Cleveland A7	.....11.65
Crawfordsville,Ind. M8	..11.65
Dover,O. G6	.....11.65
Fostoria,O. S1	.....11.95
FranklinPark,Ill. T6	..11.75
Kokomo,Ind. C16	.....11.65
Massillon,O. R8	.....11.65
Milwaukee C23	.....11.85
Monessen,Pa. P7, P16	..11.65
Palmer,Mass. W12	.....11.95
Pawtucket,R.I. N8	.....11.95
Philadelphia P24	.....11.95
Riverdale,Ill. A1	.....11.75
Rome,N.Y. R6	.....11.65
Sharon,Pa. S3	.....11.65
Trenton,N.J. R5	.....11.95
Warren,O. B9	.....11.65
Worcester,Mass. A7, T6	11.95

NAILS, Stock	Col.
AlabamaCity,Ala. R2	...173
Aliquippa,Pa. J5	173
Atlanta A11	175
Bartonville,Ill. K4	175
Chicago W13	173
Cleveland A9	173
Crawfordsville,Ind. M8	..175
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston,Tex. S5	178
Jacksonville,Fla.(20) M8	.184
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	178
Kokomo,Ind. C16	175
Minnequa,Colo. C10	178
Monessen,Pa. P7	173
Pittsburg,Calif. C11	192
Rankin,Pa. A7	173
S.Chicago,Ill. R2	173
SparrowsPt.,Md. B2	175
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

(To Wholesalers; per cwt)

Galveston,Tex. D7 ....$9.10

NAILS, Cut (100 lb keg)
To Dealers (33)

Conshohocken,Pa. A3	...$9.80
Wheeling,W.Va. W10	....9.80

POLISHED STAPLES	Col.
AlabamaCity,Ala. R2	...175
Aliquippa,Pa. J5	175
Atlanta A11	177
Bartonville,Ill. K4	177
Crawfordsville,Ind. M8	..177
Donora,Pa. A7	175
Duluth A7	175
Fairfield,Ala. T2	175
Jacksonville,Fla.(20) M8	.186
Johnstown,Pa. B2	175
Joliet,Ill. A7	175
Kokomo,Ind. C16	177
Minnequa,Colo. C10	180
Pittsburg,Calif. C11	194
Rankin,Pa. A7	175
S.Chicago,Ill. R2	175
SparrowsPt.,Md. B2	177
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	181

TIE WIRE, Automatic Baler (14½ Ga.)(Per 97 lb Net Box)
Coil No. 3150

AlabamaCity,Ala. R2	.$10.26
Atlanta A11	.....10.36
Bartonville,Ill. K4	.....10.36
Buffalo W12	.....10.26
Chicago W13	.....10.26
Crawfordsville,Ind. M8	..10.36
Donora,Pa. A7	.....10.26
Duluth A7	.....10.26
Fairfield,Ala. T2	.....10.26
Houston S5	.....10.51
Jacksonville,Fla. M8	..10.82
Johnstown,Pa. B2	.....10.26
Joliet,Ill. A7	.....10.26
KansasCity,Mo. S5	.....10.51
Kokomo Ind. C16	.....10.36
LosAngeles B3	.....11.05
Minnequa,Colo. C10	.....10.51
Pittsburg,Calif. C11	.....11.04
S.Chicago,Ill. R2	.....10.26
S.SanFrancisco C10	.....11.04
SparrowsPt.,Md. B2	....10.36
Sterling,Ill.(37) N15	...10.36

Coil No. 6500 Stand.

AlabamaCity,Ala. R2	..$10.60
Atlanta A11	.....10.70
Bartonville,Ill. K4	.....10.70
Buffalo W12	.....10.60
Chicago W13	.....10.60
Crawfordsville,Ind. M8	..10.70
Donora,Pa. A7	.....10.60
Duluth A7	.....10.60
Fairfield,Ala. T2	.....10.60
Houston S5	.....10.85
Jacksonville,Fla. M8	..11.16
Johnstown,Pa. B2	.....10.60
Joliet,Ill. A7	.....10.60
KansasCity,Mo. S5	.....10.70
Kokomo,Ind. C16	.....10.70
LosAngeles B3	.....10.85
Minnequa,Colo. C10	....10.70
Minnequa,Colo. C10	....10.85
Pittsburg,Calif. C11	...11.40
S.Chicago,Ill. R2	.....10.60
S.San Francisco C10	....11.40
SparrowsPt.,Md. B2	....10.70
Sterling,Ill.(37) N15	..10.70

Coil No. 6500 Interim

AlabamaCity,Ala. R2	..$10.65
Atlanta A11	.....10.75
Bartonville,Ill. K4	.....10.75
Buffalo W12	.....10.65
Chicago W13	.....10.65
Crawfordsville,Ind. M8	..10.75
Donora,Pa. A7	.....10.65
Duluth A7	.....10.65
Fairfield,Ala. T2	.....10.65
Houston S5	.....10.90
Jacksonville,Fla. M8	..11.21
Johnstown,Pa. B2	.....10.65
Joliet,Ill. A7	.....10.65
KansasCity,Mo. S5	.....10.90
Kokomo,Ind. C16	.....10.75
LosAngeles B3	.....11.45
Minnequa,Colo. C10	....10.90
Pittsburg,Calif. C11	...11.45
S.Chicago,Ill. R2	.....10.65
S.SanFrancisco C10	....11.45
SparrowsPt.,Md. B2	....10.75
Sterling,Ill.(37) N15	..10.75

BALE TIES, Single Loop	Col.
AlabamaCity,Ala. R2	...212
Atlanta A11	214
Bartonville,Ill. K4	214
Crawfordsville,Ind. M8	..214
Donora,Pa. A7	212
Duluth A7	212
Fairfield,Ala. T2	212
Houston S5	217
Jacksonville,Fla. M8	219
Joliet,Ill. A7	212
KansasCity,Mo. S5	217
Kokomo,Ind. C16	214
Minnequa,Colo. C10	217
Pittsburg,Calif. C11	236
S.SanFrancisco C10	236
SparrowsPt.,Md. B2	214
Sterling,Ill.(7) N15	214
Williamsport,Pa. S19	175

FENCE POSTS

Birmingham C15	171
ChicagoHts.,Ill. C2, I-2	..172
Duluth A7	172
Franklin,Pa. F5	172
Huntington,W.Va. C15	..171
Johnstown,Pa. B2	172
Marion,O. P11	172
Minnequa,Colo. C10	177
Sterling,Ill.(1) N15	172
Tonawanda,N.Y. B12	174

WIRE, Barbed	Col.
AlabamaCity,Ala. R2	..193**
Aliquippa,Pa. J5	.....190§
Atlanta A11	.....198*
Bartonville,Ill. K4	198
Crawfordsville,Ind. M8	..198
Donora,Pa. A7	.....193†
Duluth A7	.....193†
Fairfield,Ala. T2	.....193†
Houston,Tex. S5	.....198**
Jacksonville,Fla. M8	203
Johnstown,Pa. B2	.....196§
Joliet,Ill. A7	.....193†
KansasCity,Mo. S5	....198**
Kokomo,Ind. C16	.....195†
Minnequa,Colo. C10	...198**
Monessen,Pa. P7	.....196*
Pittsburg,Calif. C11	...213†
Rankin,Pa. A7	.....193†
S.Chicago,Ill. R2	.....193**
S.SanFrancisco C10	...213**
SparrowsPoint,Md. B2	..198§
Sterling,Ill.(7) N15	....198§

WOVEN FENCE, 9-15 Ga.	Col.
Ala.City,Ala. R2	.....187**
Aliq'ppa,Pa.9-14½ga.J5	190§
Atlanta A11	.....192*
Bartonville,Ill. K4	192
Crawfordsville,Ind. M8	..192
Donora,Pa. A7	.....187†
Duluth A7	.....187†
Fairfield,Ala. T2	.....187†
Houston,Tex. S5	.....192**
Jacksonville,Fla. M8	197
Johnstown,Pa.(43) B2	..190§
Joliet,Ill. A7	.....187†
KansasCity,Mo. S5	....192**
Kokomo,Ind. C16	.....189†
Minnequa,Colo. C10	...192**
Pittsburg,Calif. C11	....210†
Rankin,Pa. A7	.....187†
S.Chicago,Ill. R2	.....187**
Sterling,Ill.(7) N15	....192§

WIRE (16 gage)	An'ld Galv. Stone	Galv. Stone
Ala.City,Ala.R2	17.15	18.70**
Aliq'ppa,Pa. J5.	17.15	18.95
Bartonville K4	..17.25	19.05
Cleveland A7	...17.15	....
Crawf'dsville M8	17.25	19.05
Fostoria,O. S1	...17.65	19.20†
Houston S5	....17.40	18.95**
Jacksonville	M8.17.50	19.30
Johnstown B2	...17.15	18.95§
Kan.City,Mo. S5	17.40	....
Kokomo C16	...17.25	18.80†
Minnequa C10	..17.40	18.95**
P'lm'r,Mass.W12	17.45	19.00†
Pitts.,Calif. C11	.17.50	19.05†
SparrowsPt. B2	.17.25	19.05§
Sterling(37) N15	.17.25	19.05§
Waukegan A7	...17.15	18.70†
Worcester A7	...17.45	....

WIRE, Merchant Quality

(6 to 8 gage)	An'ld Galv.
Ala.City,Ala. R2	8.65 9.20**
Aliquippa J5	....8.65 9.325§
Atlanta(48) A11	..8.75 9.425*
Bartonville(48) K4	8.75 9.425
Buffalo W12	....8.65 9.20†
Cleveland A7	....8.65 ....
Crawfordsville M8	.8.75 9.425
Donora,Pa. A7	....8.65 9.20†
Duluth A7	....8.65 9.20†
Fairfield T2	....8.65 9.20†
Houston(48) S5	..8.90 9.45**
Jacks'ville,Fla. M8	9.00 9.675
Johnstown B2(48)	8.65 9.325§
Joliet,Ill. A7	....8.65 9.20†
Kans.City(48) S5	.8.90 9.45**
Kokomo C16	....8.75 9.30†
LosAngeles B3	9.60 10.275§
Minnequa C10	...8.90 9.45**
Monessen P7(48)	..8.65 9.25*
Palmer,Mass. W12	.8.95 9.50†
Pitts.,Calif. C11	..9.60 10.15†
Rankin,Pa. A7	...8.65 9.20†
S.Chicago R2	....8.65 9.20**
S.SanFran. C10	..9.60 10.15**
Spar'wsPt.B2(48)	8.75 9.425§
Sterling(48) N15	..8.90 9.575§
Sterling(1)(48)	..8.80 9.475§
Struth'rs,O.(48)Y1	8.65 9.30†
Worcester,Mass.A7	8.95 9.50†

Based on zinc price of: *13.50c. †5c. §10c. ‡Less than 10c. ††10.50c. **Subject to zinc equalization extras.

FASTENERS

(Base discounts, full container quantity, per cent off list, f.o.b. mill)

BOLTS

Carriage, Machine Bolts
Full Size Body (cut thread)
½ in. and smaller:
6 in. and shorter.... 49.0
Longer than 6 in.... 39.0
⅝ in. thru 1 in.:
6 in. and shorter.... 39.0
Longer than 6 in.... 35.0
1⅛ in. and larger:
All lengths 35.0
Undersized Body (rolled thread)
½ in. and smaller:
6 in. and shorter... 49.0

Carriage, Machine, Lag Bolts
Hot Galvanized:
½ in. and smaller:
6 in. and shorter... 29.0
Longer than 6 in... 15.0
⅝ in. and larger:
All lengths 12.0

Lag Bolts (all diam.)
6 in. and shorter... 49.0
Longer than 6 in... 39.0

Plow and Tap Bolts
½ in. and smaller by 6 in. and shorter 49.0
Larger than ½ in. or longer than 6 in... 39.0

Blank Bolts 39.0

Step, Elevator, Tire Bolts 49.0

Stove Bolts, Slotted:
⅛ to ¼-in. incl., 3 in. and shorter.. 55.0
⅛ to ½ in., inclusive 55.0

NUTS

Reg. & Heavy Square Nuts:
All sizes 55.5

Square Nuts, Reg. & Heavy, Hot Galvanized:
All sizes 41.0

Hex Nuts, Reg. & Heavy, Hot Pressed:
⅜ in. and smaller.. 60.5
⅞ in. to 1 in., incl. 55.5
1⅛ in. to 1½ in., incl. 58.5
1⅝ in. and larger.. 53.5

Hex Nuts, Reg. & Heavy, Cold Punched:
⅜ in. and smaller.. 60.5
⅞ in. to 1½ in., incl. 55.5
1⅝ in. and larger.. 53.5

Hex Nuts, All Types, Hot Galvanized:
⅜ in. and smaller.. 46.5
⅞ in. to 1 in., incl. 41.5
1⅛ in. to 1½ in., incl. 46.5

Hex Nuts, Semifinished, Heavy (Incl. Slotted):
¾ in. and smaller.. 60.5
⅞ in. to 1½ in., incl. 55.5
1⅝ in. and larger.. 53.5

Hex Nuts, Finished (Incl. Slotted and Castellated):
1 in. and smaller.. 63.0
1⅛ in. to 1½ in., incl. 59.0
1⅝ in. and larger.. 53.5

Semifinished Hex Nuts, Reg. (Incl. Slotted):
⅝ in. and smaller.. 60.5
⅞ in. to 1 in., incl. 63.0
1⅛ in. to 1½ in., incl. 59.0
1⅝ in. and larger.. 53.5

CAP AND SETSCREWS
(Base discounts, packages, per cent off list, f.o.b. mill)

Hex Head Capscrews, Coarse or Fine Thread, Bright:
6 in. and shorter:
⅝ in. and smaller.. 40.0
¾, ⅞, and 1 in. diam. 22.0
Longer than 6 in.:
⅝ in. and smaller.. 8.0
¾, ⅞, and 1 in. diam. ..... +6.0

High Carbon, Heat Treated:
6 in. and shorter:
⅝ in. and smaller.. 26.0
¾, ⅞, and 1 in. diam. 3.0
Longer than 6 in.:
⅝ in. and smaller.. +13.0
¾, ⅞, and 1 in. diam. ..... +32.0

Flat Head Capscrews:
⅜ in. and smaller.. +76.0

Setscrews, Square Head, Cup Point, Coarse Thread:
Through 1 in. diam.:
6 in. and shorter... Net
Longer than 6 in... +23

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great.
Structural ½ in., larger 12.25
⅞ in. under: List less 19%

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	25.98	23.54
1¼	13	....	30.78	23.36
1½	13	29.03	34.01	25.83
1¾	13	34.29	40.18	30.51
2	13	38.44	45.05	34.20
2¼	13	43.29	50.75	38.52
2½	12	46.99	55.06	41.81
2½	12	51.76	60.65	46.05
2¾	12	56.04	65.67	49.88
3	12	59.76	70.03	53.19

RAILWAY MATERIALS

	Standard No. 1	Standard No. 2	Tee Rails All No. 2	Tee Rails 60 lb Under
RAILS				
Bessemer,Pa. U5	5.525	5.425	....	6.50
Ensley,Ala. T2	5.525	5.425	....	6.50
Fairfield,Ala. T2	....	....	....	6.50
Gary,Ind. U5	5.525	5.425	....	....
Huntington,W.Va. C15	....	....	....	6.50
IndianaHarbor,Ind. I-2	5.525	5.425	5.475	....
Johnstown,Pa. B2	....	....	...(16)	6.50
Lackawanna,N.Y. B2	5.525	5.425	....	6.50
Minnequa,Colo. C10	5.525	5.425	....	7.00
Steelton,Pa. B2	5.525	5.425	....	....
Williamsport,Pa. S19	....	....	....	6.50

TIE PLATES	
Fairfield,Ala. T2	.....6.60
Gary,Ind. U5	.....6.60
Ind.Harbor,Ind. I-2	....6.60
Lackawanna,N.Y. B2	..6.60
Minnequa,Colo. C10	....6.60
Seattle B3	.....6.75
Steelton,Pa. B2	.....6.60
Torrance,Calif. C11	....6.75
JOINT BARS	
Bessemer,Pa. U5	.....6.975
Fairfield,Ala. T2	.....6.975
Ind.Harbor,Ind. I-2	...6.975
Joliet,Ill. U5	.....6.975
Lackawanna,N.Y. B2	..6.975
Minnequa,Colo. C10	..6.975
Steelton,Pa. B2	.....6.975
AXLES	
Ind.Harbor,Ind. S13	...8.775
Johnstown,Pa. B2	....8.775

TRACK BOLTS, Untreated	
Cleveland R2	.....14.75
KansasCity,Mo. S5	....14.75
Lebanon,Pa. B2	.....14.75
Minnequa,Colo. C10	...14.75
Pittsburgh P14	.....14.75
Seattle B3	.....15.25
SCREW SPIKES	
Lebanon,Pa. B2	.....14.50
STANDARD TRACK SPIKES	
Fairfield, Ala. T2	.....9.75
Ind.Harbor,Ind. I-2, Y1	.9.75
KansasCity,Mo. S5	....9.75
Lebanon,Pa. B2	.....9.75
Minnequa,Colo. C10	....9.75
Pittsburgh J5	.....9.75
Seattle B3	.....10.25
S.Chicago,Ill. R2	.....9.75
Struthers,O. Y1	.....9.75
Youngstown R2	.....9.75

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1¼ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in., 6.70c; 1 15/16 to 8 in., inclusive, 7.05c.
(6) Chicago or Birm. base.
(7) Chicago base 2 cols. lower.
(8) 13 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ¾" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) Plus 1c per 100 lb.
(21) New Haven, Conn. base.
(22) Deld. San Francisco Bay area.
(23) Special quality.
(24) Deduct 0.15c, finer than 15 Ga.
(25) Bar mill bands.
(26) Delivered in mill zone, 6.045c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝ in.; 7.60c, for widths ⅝ in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 14 Ga. & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. in mill zone or within switching limits, 5.685c.
(43) 9-14½ Ga.
(44) To fabricators.
(45) 0.022 in. and lighter, over 0.022", 8.20c.
(46) Special quality.
(48) 6-7 Ga.
(49) 3½ in. and smaller rounds; 9.30c, over 3½ in. and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+9.25	+24.25	+2.75	+19.5	+0.25	+17	1.25	+15.5	1.25	+15.5	1	+15.75	3.5	+13.25
Ambridge, Pa. N2	+9.25	....	+2.75	....	+0.25	....	1.25	....	1.25	....	1	....	3.5	....
Lorain, O. N3	+9.25	+24.25	+2.75	+19.5	+0.25	+17	1.25	+15.5	1.25	+15.5	1	+15.75	3.5	+13.25
Youngstown Y1	+9.25	+24.25	+2.75	+19.5	+0.25	+17	1.25	+15.5	1.25	+15.5	1	+15.75	3.5	+13.25

ELECTRIC STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+9.25	+24.25	+2.75	+19.5	+0.25	+17	1.25	+15.5	1.25	+15.5	1	+15.75	3.5	+13.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Alton, Ill. L1	....	....	....	....	....	....	3.25	+12	6.25	+8	9.75	+3.5	12.25	+2.75
Benwood, W. Va. W10	4.5	+22	+7.5	+31	+18	+39.5	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Butler, Pa. F6	5.5	+21	+6.5	+30	+17	+38.5	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Fairless, Pa. N3	....	....	....	....	....	....	3.25	+12	6.25	+8	9.75	+3.5	12.25	+2.75
Fontana, Calif. K1	....	....	....	....	....	....	+8.25	+23.5	+5.25	+19.5	+1.75	+15	0.75	+14.25
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	4.25	+11	7.25	+7	10.75	+2.5	13.25	+3.25
Lorain, O. N3	....	....	....	....	....	....	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Sharon, Pa. S4	5.5	+21	+6.5	+30	+17	+38.5	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Sparrows Pt., Md. B2	3.5	+23	8.5	+32	+19	+40.5	3.25	+12	6.25	+8	9.75	+3.5	12.25	+2.75
Wheatland, Pa. W9	5.5	+21	+6	+30	+17	+38.5	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Youngstown R2, Y1	....	....	....	....	....	....	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.73		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	....	....	....	....
Alton, Ill. L1	12.75	+1.75	13.25	+1.25	14.75	+1.5	14.75	+1.5	....	....	....	....
Benwood, W. Va. W10	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	6.25	+10.5	6.25	+10.5
Etna, Pa. N2	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	6.25	+10.5	6.25	+10.5
Fairless, Pa. N3	12.75	+1.75	13.25	+1.25	14.75	+1.5	14.75	+1.5	4.25	+12.5	4.25	+12.5
Fontana, Calif. K1	1.25	+13.25	1.75	+12.75	3.25	+13	3.25	+13	+7.25	+24	+7.25	+24
Indiana Harbor, Ind. Y1	13.75	+0.75	14.25	+0.25	15.75	+0.5	15.25	+0.5	5.25	+11.5	5.25	+11.5
Lorain, O. N3	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	....	....	....	....
Sharon, Pa. M6	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	....	....	....	....
Sparrows Pt., Md. B2	12.75	+1.75	13.25	+1.25	14.75	+1.5	14.75	+1.5	4.25	+12.5	4.25	+12.5
Wheatland, Pa. W9	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	6.25	+10.5	6.25	+10.5
Youngstown R2, Y1	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	6.25	+10.5	6.25	+10.5

*Galvanized pipe discounts based on current price of zinc (10.00c, East St. Louis).

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	—Rerolling— Ingot	Slabs	Forging Billets	H.R. Strip	Wire Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	22.00	27.00	....	36.00	....	42.00	44.25	48.50	45.00
202	23.75	30.25	36.50	39.00	40.75	43.00	45.00	49.25	49.25
301	23.25	28.00	37.25	37.25	42.00	44.25	46.25	51.25	47.50
302	25.25	31.50	38.00	40.50	42.75	45.00	47.25	52.00	52.00
302B	25.50	32.75	40.75	45.75	45.00	47.25	49.50	57.00	57.00
303	....	32.00	41.00	....	45.50	48.00	50.00	56.75	56.75
304	27.00	33.25	40.50	44.25	45.25	47.75	50.75	55.50	55.50
304L	....	....	48.25	51.50	53.00	55.50	58.50	63.25	63.25
305	28.50	36.75	42.50	47.50	45.25	47.75	51.25	58.75	58.75
308	30.75	38.25	47.25	50.25	52.75	55.75	60.25	63.00	63.00
309	39.75	49.50	57.75	64.50	63.75	67.00	71.00	80.50	80.50
310	49.75	61.50	78.00	84.25	86.50	91.00	92.75	96.75	96.75
314	....	....	....	....	86.50	....	92.75	....	104.50
316	39.75	49.50	62.25	69.25	69.25	73.00	76.75	81.50	81.50
316L	....	....	70.00	76.50	77.00	80.75	84.50	89.25	89.25
317	48.00	60.00	76.75	88.25	86.25	90.75	93.50	101.00	101.00
321	32.25	40.00	47.00	53.50	52.50	55.50	59.75	65.50	65.50
330	....	....	106.75	....	106.75	106.75	105.50	108.00	149.25
18-8 CbTa	37.00	46.50	55.75	63.50	61.50	64.75	69.75	79.25	79.25
403	....	....	32.00	....	35.75	37.75	40.25	48.25	48.25
405	19.50	25.50	29.75	36.00	33.50	35.25	37.50	46.75	46.75
410	16.75	21.50	28.25	31.00	32.00	33.75	35.00	40.25	40.25
416	....	....	28.75	....	32.50	34.25	36.25	48.25	48.25
420	....	33.50	34.25	41.75	39.25	41.25	45.25	62.00	62.00
430	17.00	21.75	28.75	32.00	32.50	34.25	36.00	40.75	40.75
430F	....	....	29.50	....	33.00	34.75	36.75	51.75	51.75
431	....	28.75	37.75	....	42.00	44.25	46.00	56.00	56.00
446	....	....	39.25	59.00	44.25	46.50	47.75	70.00	70.00

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; American Steel & Wire Div., U. S. Steel Corp.; Anchor Drawn Steel Co., division of Vanadium-Alloys Steel Co.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; A. M. Byers Co.; G. O. Carlson Inc.; Carpenter Steel Co.; Charter Wire Products; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Firth Sterling Inc.; Fort Wayne Metals Inc.; Green River Steel Corp., subsidiary of Jessop Steel Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Ellwood Ivins Steel Tube Works Inc.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Jones & Laughlin Steel Corp.; Joslyn Stainless Steels, division of Joslyn Mfg. & Supply Co.; Latrobe Steel Co.; Lukens Steel Co.; Maryland Fine & Specialty Wire Co. Inc.; McInnes Steel Co.; McLouth Steel Corp.; Metal Forming Corp.; Midvale-Heppenstall Co.; National Standard Co.; National Tube Div., U. S. Steel Corp.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Riverside-Alloy Metal Div., H. K. Porter Company Inc.; Rodney Metals Inc.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Standard Tube Co.; Superior Steel Corp.; Superior Tube Co.; Swepco Tube Corp.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co., subsidiary of Crucible Steel Co. of America; Tube Methods Inc.; Ulbrich Stainless Steels Inc.; U. S. Steel Corp.; Universal-Cyclops Steel Corp.; Vanadium-Alloys Steel Co.; Wall Tube & Metal Products Co.; Wallingford Steel Co., subsidiary of Allegheny Ludlum Steel Corp.; Washington Steel Corp.

Clad Steel

	Plates—Carbon Base 5%	10%	15%	20%	Sheets Carbon Base 20%
Stainless					37.50
302	....	....	....	....	40.00
304	34.70	37.95	42.25	46.70	
304L	36.90	40.55	45.10	49.85	....
316	40.35	44.40	49.50	54.50	58.75
316L	45.05	49.35	54.70	60.10	....
316 Cb	47.30	53.80	61.45	69.10	....
321	36.60	40.05	44.60	49.30	47.25
347	38.25	42.40	47.55	52.80	57.00
405	28.60	29.85	33.35	36.85	....
410	28.15	29.55	33.10	36.70	....
430	28.30	29.80	33.55	37.25	....
Inconel	48.90	59.55	70.15	80.85	....
Nickel	41.65	51.95	62.30	72.70	....
Nickel, Low Carbon	41.95	52.60	63.30	74.15	....
Monel	43.35	53.55	63.80	74.05	....
Copper*	....	....	....	....	46.00

	Strip, Carbon Base —Cold Rolled— 10%	Both Sides
Copper*	33.95	40.25

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4, and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Regular Carbon	0.305	Cr Hot Work	0.510
Extra Carbon	0.360	W-Cr Hot Work	0.500
Special Carbon	0.475	V-Cr Hot Work	0.475
Oil Hardening	0.475	Hi-Carbon-Cr	0.830

Grade by Analysis (%)

W	Cr	V	Co	Mo		$ per lb
20.25	4.25	1.6	12.25	...	.....	4.285
18.25	4.25	1	4.75	...	.....	2.500
18	4	2	9	...	.....	2.870
18	4	2	....	...	.....	1.960
18	4	1	....	...	.....	1.795
9	3.5	..	....	...	.....	1.395
13.5	4	3	....	...	.....	2.060
13.75	3.75	2	5	...	.....	2.440
6.4	4.5	1.9	....	5	.....	1.300
6	4	3	....	6	.....	1.545
1.5	4	1	....	8.5	.....	1.155

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal transportation tax.

	Basic	No. 2 Foundry	Malle-able	Besse-mer
Birmingham District				
AlabamaCity,Ala. R2	62.00	62.50	....	....
Birmingham R2	62.00	62.50‡	....	....
Birmingham U6	....	62.50‡	66.50	....
Woodward,Ala. W15	62.00**	62.50‡	66.50	....
Cincinnati, deld.	....	70.20	....	....
Buffalo District				
Buffalo H1, R2	66.00	66.50	67.00	67.50
N.Tonawanda,N.Y. T9	....	66.50	67.00	67.50
Tonawanda,N.Y. W12	66.00	66.50	67.00	67.50
Boston, deld.	77.29	77.79	78.29	....
Rochester,N.Y., deld.	69.02	69.52	70.02	....
Syracuse,N.Y., deld.	70.12	70.62	71.12	....
Chicago District				
Chicago I-3	66.00	66.50	66.50	67.00
S.Chicago,Ill. R2	66.00	....	66.50	....
S.Chicago,Ill. W14	66.00	....	66.50	67.00
Milwaukee, deld.	68.62	69.12	69.12	69.62
Muskegon,Mich., deld.	....	74.12	74.12	....
Cleveland District				
Cleveland R2, A7	66.00	66.50	66.50	67.00
Akron,Ohio, deld.	69.12	69.62	69.62	70.12
Mid-Atlantic District				
Birdsboro,Pa. B10	68.00	68.50	69.00	69.50
Chester,Pa. P4	66.50	67.00	67.50	....
Swedeland,Pa. A3	68.00	68.50	69.00	69.50
NewYork, deld.	....	75.10	75.60	....
Newark,N.J., deld.	72.29	72.79	73.29	73.79
Philadelphia, deld.	70.01	70.51	71.01	71.59
Troy,N.Y. R2	68.00	68.50	69.00	69.50
Pittsburgh District				
NevilleIsland,Pa. P6	66.00	66.50	66.50	67.00
Pittsburgh (N&S sides), Aliquippa, deld.	....	67.95	67.95	68.48
McKeesRocks,Pa., deld.	....	67.60	67.60	68.13
Lawrenceville,Homestead, Wilmerding,Monaca,Pa., deld.	....	68.26	68.26	68.79
Verona,Trafford,Pa., deld.	68.29	68.82	68.82	69.35
Brackenridge,Pa., deld.	68.60	69.10	69.10	69.63
Midland,Pa. C18	66.00	....	....	....

	Basic	No. 2 Foundry	Malle-able	Besse-mer
Youngstown District				
Hubbard,Ohio Y1	....	....	66.50	....
Sharpsville,Pa. S6	66.00	....	66.50	67.00
Youngstown Y1	....	....	66.50	67.00
Mansfield,Ohio, deld.	70.90	....	71.40	71.90
Duluth I-3	66.00	66.50	66.50	67.00
Erie,Pa. I-3	66.00	66.50	66.50	67.00
Everett,Mass. E1	67.50	68.00	68.50	....
Fontana,Calif. K1	75.00	75.50	....	....
Geneva,Utah C11	66.00	66.50	....	....
GraniteCity,Ill. G4	67.90	68.40	68.90	....
Ironton,Utah C11	66.00	66.50	....	....
Minnequa,Colo. C10	68.00	68.50	69.00	....
Rockwood,Tenn. T3	....	62.50‡	66.50	....
Toledo,Ohio I-3	66.00	66.50	66.50	67.00
Cincinnati, deld.	72.54	73.04	....	....

**Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.
‡Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.50.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.

Nickel: Under 0.50% no extra; 0.50-0.74%, inclusive, add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1 for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 11.50%; starting with silicon over 11.50% add $1.50 per ton for each 0.50% silicon or portion thereof up to 14%; add $1 for each 0.50% Mn over 1%)

Jackson,Ohio I-3, J1	78.00
Buffalo H1	79.25

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

CalvertCity,Ky. P15	$99.00
NiagaraFalls,N.Y. P15	99.00
Keokuk,Iowa Open-hearth & Fdry, $9 freight alowed K2	103.50
Keokuk,Iowa O.H. & Fdry, 12½ lb piglets, 16% Si, max fr'gt allowed up to $9, K2	106.50

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles,Tenn. T3 (Phos. 0.035% max)	$78.50
Troy,N.Y. R2 (Phos. 0.035% max)	74.00
Philadelphia, deld.	82.27
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Erie,Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
NevilleIsland,Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	71.00

Warehouse Steel Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 15 cents per 100 lb except: Moline, Norfolk, Richmond, Washington, 20 cents: Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, Spokane, San Francisco, 10 cents: Atlanta, Chattanooga, Houston, Seattle, no charge.

	SHEETS				STRIP	BARS			Standard Structural Shapes	PLATES	
	Hot-Rolled	Cold-Rolled	Gal. 10 Ga.†	Stainless Type 302	Hot-Rolled*	H.R. Rounds	C.F. Rds.‡	H.R. Alloy 4140††[5]		Carbon	Floor
Atlanta	8.59§	9.86§	....	....	8.64	9.01	10.68	....	9.05	8.97	10.90
Baltimore	8.28	8.88	9.61	....	8.76	9.06	11.34#	15.18	9.19	8.66	10.14
Birmingham	8.18	9.45	11.07	....	8.23	8.60	10.57	....	8.64	8.56	10.70
Boston	9.38	10.44	11.45	53.50	9.42	9.73	12.90#	15.28	9.63	9.72	11.20
Buffalo	8.40	9.00	10.07	55.98	8.50	8.80	10.90#	15.00	8.90	8.90	10.45
Chattanooga	8.35	9.69	9.65	....	8.40	8.77	10.46	....	8.88	8.80	10.66
Chicago	8.20	9.45	10.00	53.00	8.23	8.60	8.80	14.65	8.64	8.56	9.88
Cincinnati	8.34	9.48	10.05	52.43	8.54	8.92	9.31	14.96	9.18	8.93	10.21
Cleveland	8.18	9.45	9.95	55.68	8.33	8.69	10.80#	14.74	9.01	8.79	10.11
Dallas	8.85	10.15	....	....	9.00	8.95	11.01	....	9.00	9.45	10.70
Denver	9.38	11.75	....	....	9.41	9.78	11.10	....	9.82	9.74	11.06
Detroit	8.43	9.70	10.35	65.25	8.58	8.90	9.15	14.91	9.18	8.91	10.13
Erie, Pa.	8.20	9.45	9.95[10]	....	8.50	8.75	9.05[10]	....	9.00	8.85	10.10
Houston	8.45	9.75	8.45	....	8.60	8.55	11.10	....	8.60	9.05	10.30
Jackson, Miss.	8.52	9.79	....	....	8.57	8.94	10.68	....	8.97	8.90	10.74
Los Angeles	9.50	10.75	11.65	....	9.55	9.55	12.75	16.00	9.10	9.55	11.70
Milwaukee	8.33	9.58	10.13	....	8.36	8.73	9.03	14.78	8.85	8.69	10.01
Moline, Ill.	8.55	9.80	10.35	....	8.58	8.95	9.15	....	8.99	8.91	....
New York	8.87	10.13	10.56	53.08	9.31	9.57	12.76#	15.09	9.35	9.43	10.71
Norfolk, Va.	8.05	....	....	....	8.55	8.60	10.80	....	8.95	8.45	9.95
Philadelphia	8.00	8.90	9.87	51.94	8.69	8.65	11.51#	15.01	8.50	8.77	9.77**
Pittsburgh	8.18	9.45	10.35	52.00	8.33	8.60	10.80#	14.65	8.64	8.56	9.88
Portland, Oreg.	8.50	11.20	11.55	57.38	11.35†‡	8.65	14.65#	15.95	8.65	8.30	11.50
Richmond, Va.	8.45	....	10.40	....	9.15	9.15	....	....	9.40	8.85	10.35
St. Louis	8.54	9.79	10.36	....	8.54	8.97	9.41	15.01	9.10	8.93	10.25
St. Paul	8.79	10.04	10.61	....	8.84	9.21	9.66	....	9.38	9.30	10.49
San Francisco	9.35	10.75	10.85	55.10	9.55	9.70	13.00	16.10	9.50	9.60	12.00
Seattle	9.95	11.15	12.00	57.38	10.00	10.10	14.05	16.35	9.80	9.70	12.10
Spokane	9.95	11.15	12.00	57.38	10.00	10.10	14.05	17.20	9.80	9.70	12.10
Washington	8.48	9.58	....	....	9.06	9.15	9.73	....	9.35	8.86	10.36

*Prices do not include gage extras; †prices include gage and coating extras; ‡includes 35-cent bar quality extras; §42 in. and under; **¼ in. and heavier; ††as annealed; ‡‡over 4 in.; §§over 3 in.; #1 in. round C-1018.

Base quantities, 2000 to 4999 lb except as noted; cold-rolled strip and cold-finished bars, 2000 lb and over except in Seattle, 2000 to 9999 lb, and in Los Angeles, 6000 lb and over; stainless sheets, 8000 lb except in Chicago, New York, Boston, Seattle, Portland, Oreg. 10,000 lb and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb, except in Portland, Oreg., 1000 to 9999 lb; [3]—400 to 9999 lb; [6]—1000 to 1999 lb; [8]—2000 to 3999 lb; [10]—2000 lb and over.

Refractories

Fire Clay Brick (per 1000)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, Ohio, Ottawa, Ill., Stevens Pottery, Ga., $135; Salina, Pa., $140; Niles, Ohio, $138; Cutler, Utah, $165.

Super-Duty: Ironton, Ohio., Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Pa., New Savage, Md., St. Louis, $175; Stevens Pottery, Ga., $185; Cutler, Utah, $233.

Silica Brick (per 1000)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt. Matilda, Pa., Portsmouth, Ohio, Hawstone, Pa., $150; Warren, Niles, Windham, Ohio, Hays, Latrobe, Morrisville, Pa., $155; E. Chicago, Ind., Joliet, Rockdale, Ill., $160; Lehigh, Utah, $175; Los Angeles, $180.

Super-Duty: Sproul, Hawstone, Pa., Niles Warren, Windham, Ohio, Leslie, Md., Athens, Tex., $157; Morrisville, Hays, Latrobe, Pa., $160; E. Chicago, Ind., $167; Curtner, Calif., $182.

Silica Brick (per 1000)

Clearfield, Pa., $140; Philadelphia, $137; Woodbridge, N. J., $135.

Ladle Brick (per 1000)

Dry Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Vanport, Pa., Mexico, Vandalia, Mo., Wellsville, Irondale, New Salisbury, Ohio, $96.75; Clearfield, Pa., Portsmouth, Ohio, $102.

High-Alumina Brick (per 1000)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $235; Danville, Ill., $238; Philadelphia, Clearfield, Pa., $230; Orviston, Pa., $245.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $295; Danville, Ill., $298; Philadelphia, Clearfield, Orviston, Pa., $305.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $335; Danville, Ill., $338; Philadelphia, Clearfield, Orviston, Pa., $345.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $188.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $310.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $234.

Dolomite (per net ton)

Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, Gibsonburg, Narlo, Ohio, $16.75; Thornton, McCook, Ill., $17; Dolly Siding, Bonne Terre, Mo., $15.

Magnesite (per net ton)

Domestic, dead-burned, bulk ½ in. grains with fines: Chewelah, Wash., Luning, Nev., $46; ⅜ in. grains with fines: Baltimore, $73.

Fluorspar

Metallurgical grades, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $37-41; 70%, $36.40; 60%, $33-36.50. Imported, net tons, f.o.b. cars point of entry duty paid, metallurgical grade: European, $33-34; Mexican, all-rail, duty paid, $25.25-25.75; barge, Brownsville, Tex., $27.25-27.75.

Metal Powder

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

	Cents
Sponge Iron, Swedish: Deld. east of Mississippi River, ocean bags 23,000 lb and over..	10.50
F.o.b. Riverton or Camden, N. J., west of Mississippi River.	9.50
Sponge Iron, Domestic, 98 + % Fe: Deld. east of Mississippi River, 23,000 lb and over	10.50
F.o.b. Riverton, N. J., west of Mississippi River	9.50
Electrolytic Iron: Melting stock, 99.9% Fe, irregular fragments of ⅛ in. x 1.3 in.	28.00
Annealed, 99.5% Fe..	36.50
Unannealed (99 + % Fe)	36.00
Unannealed (99 + % Fe) (minus 325 mesh)	59.00
Powder Flakes (minus 16, plus 100 mesh)..	29.00
Carbonyl Iron: 98.1-99.9%, 3 to 20 microns, depending on grade, 93.00-290.00 in standard 200-lb containers; all minus 200 mesh.	
Aluminum: Atomized, 500 lb drum, frght allowed Carlots	39.50
Ton lots	41.50
Antimony, 500 lb lots	42.00*
Brass, 5000-lb lots	31.30-38.40†
Bronze, 5000-lb lots	48.10-52.70†
Copper: Electrolytic	14.25*
Reduced	14.25*
Lead	7.50*
Manganese: Minus 35 mesh	64.00
Minus 100 mesh	70.00
Minus 200 mesh	75.00
Nickel unannealed ...	$1.065
Nickel-Silver, 5000-lb lots	49.20-61.30†
Phosphor-Copper, 5000-lb lots	59.80
Copper (atomized) 5000-lb lots	40.30-48.80‡
Silicon	47.50
Solder	7.00*
Stainless Steel, 304 ..	$1.02
Stainless Steel, 316 ..	$1.20
Tin	14.50*
Zinc, 5000-lb lots	17.50-30.70‡

Tungsten:	Dollars
Melting grade, 99% 60 to 2000 mesh:	
1000 lb and over ..	3.15
Less than 1000 lb ..	3.30
Chromium, electrolytic 99.8% Cr min metallic basis	5.00

*Plus cost of metal. †Depending on composition. ‡Depending on mesh.

Electrodes

Threaded with nipple; unboxed, f.o.b. plant

GRAPHITE

——Inches—— Diam	Length	Per 100 lb
2	24	$60.75
2½	30	39.25
3	40	37.00
4	40	35.00
5⅛	40	34.75
6	60	31.50
7	60	28.25
8, 9, 10	60	28.00
12	72	26.75
14	60	26.75
16	72	25.75
17	60	26.25
18	72	26.25
20	72	25.25
24	84	26.00

CARBON

8	60	13.30
10	60	13.00
12	60	12.95
14	60	12.85
14	72	11.95
17	60	11.85
17	72	11.40
20	84	11.40
20	90	11.00
24	72, 84	11.25
24	96	10.95
30	84	11.05
40, 35	110	10.70
40	100	10.70

Imported Steel

(Base per 100 lb, landed, duty paid, based on current ocean rates. Any increase in these rates is for buyer's account. Source of shipment: Western continental European countries)

	North Atlantic	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305...	$6.28	$6.23	$6.23	$6.48
Bar Size Angles	6.62	6.57	6.57	6.75
Structural Angles	6.62	6.57	6.57	6.75
I-Beams	6.87	6.82	6.82	7.00
Channels	6.87	6.82	6.82	7.00
Plates (basic bessemer)	8.35	8.30	8.30	8.60
Sheets, H.R.	8.25	8.20	8.20	8.50
Sheets, C.R. (drawing quality)	9.00	8.95	8.95	9.25
Furring Channels, C.R., 1000 ft, ¾ x 0.30 lb per ft	26.79	26.67	26.67	27.36
Barbed Wire (†)	6.95	6.95	6.95	7.40
Merchant Bars	6.87	6.82	6.82	7.22
Hot-Rolled Bands	7.20	7.15	7.15	7.55
Wire Rods, Thomas Commercial No. 5	6.73	6.73	6.73	7.13
Wire Rods, O.H. Cold Heading Quality No. 5	7.07	7.07	7.07	7.47
Bright Common Wire Nails ($)	8.38	8.38	8.38	8.58

†Per 82 lb. net, reel. $Per 100-lb kegs, 20d nails and heavier.

Ores

Lake Superior Iron Ore

(Prices effective for the 1957 shipping season, gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi bessemer	$11.60
Mesabi nonbessemer	11.45
Old Range bessemer	11.55
Old Range nonbessemer	11.70
Open-hearth lump	12.70
High phos.	11.45

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 30, 1957, and increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

New Jersey, foundry and basic concentrates	62-64% 25.00-27.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 65%	27.00-27.50
N. African hematite (spot)	nom.
Brazilian iron ore, 68-69%	28.00

Tungsten Ore

Net ton, unit

Foreign wolframite, good commercial quality	$13.50-14.25*
Domestic, concentrates f.o.b. milling points	20.00-22.00

*Before duty.

Manganese Ore

Mn 46-48%, Indian (export tax included), $1.35-1.40 per long ton unit, c.i.f. U. S. ports, duty for buyer's account: other than Indian, $1.35-1.40; contracts by negotiation.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian

48% 3:1	$51.00-53.00
48% 2.8:1	48.00-50.00
48% no ratio	41.00-43.00

South African Transvaal

48% no ratio	$40.00-43.00
44% no ratio	30.00-30.50

Turkish

48% 3:1	$59.00

Domestic

Rail nearest seller

18% 3:1	$39.00

Molybdenum

Sulfide concentrate, per lb of Mo content, mines, unpacked	$1.18

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard

55-60%	$2.50-2.60
60-65%	2.60-2.90

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, Pa., furnace	$14.75-15.75
Connellsville, Pa., foundry	18.00-18.50

Oven Foundry Coke

Birmingham, ovens	$28.85
Cincinnati, deld.	31.84
Buffalo, ovens	30.50
Camden, N. J., ovens	29.50
Detroit, ovens	30.50
Pontiac, Mich., deld.	32.25
Saginaw, Mich., deld.	33.83
Erie, Pa., ovens	30.50
Everett, Mass., ovens New England, deld.	31.55*
Indianapolis, ovens	29.75
Ironton, Ohio, ovens	29.00
Cincinnati, deld.	31.84
Kearny, N. J., ovens	29.75
Milwaukee, ovens	30.50
Painesville, Ohio, ovens	30.50
Cleveland, deld.	32.69
Philadelphia, ovens	29.50
St. Louis, ovens	31.50
Neville Island (Pittsburgh), Pa., ovens	29.25
St. Paul, ovens	29.75
Chicago, deld.	33.24
Swedeland, Pa., ovens	29.50
Terre Haute, Ind., ovens	29.75

*Or within $4.85 freight zone from works.

Coal Chemicals

Spot, cents per gallon, ovens

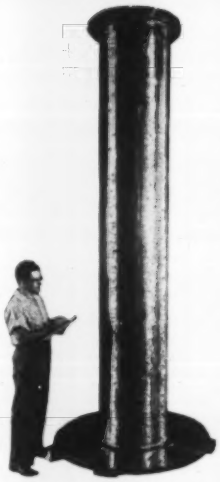
Pure benzene	36.00
Toluene, one deg.	29.50
Industrial xylene	32.00-34.00

Per ton, bulk, ovens

Ammonium sulfate	$32.00-34.00

Cents per pound, producing point

Phenol: Grade 1, 17.50; Grade 2-3, 15.50; Grade 4, 17.50; Grade 5, 16.50; Grade 6, 14.50.



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Moltrup *Steel Products Co.*
BEAVER FALLS, PA.

(*Concluded from Page* 168)

Goldman Inc., low on general contract.

780 tons, 374-ft welded plate girder bridge, Shinnecock Canel, Sunrise Highway extension, Suffolk County, N. Y.; bids Nov. 21, Albany, N. Y.

730 tons, state bridge work, St. Lawrence County, N. Y., A. S. Wikstrom Inc., Skaneateles, N. Y., low on general contract.

700 tons, seven state bridges, Middleboro, Mass.; Henley-Lundgren Co. Inc., Shrewsbury, Mass., and Central Construction Co., Lawrence, Mass., joint contractors.

650 tons, six-span rolled beam bridge, Naugatuck River, Ansonia, Conn.; bids Nov. 15, Hartford, Conn.

595 tons, three state bridges, Bangor, Maine; bids Nov. 13, Augusta, Maine.

545 tons, three highway separation structures, composite I-beam bridges, Interstate Route 505, Jefferson County, N. Y.; bids Nov. 21, Albany, N. Y.

515 tons, three bridge structures, West Rutland-Rutland, Vt., bids Nov. 15, Montpelier, Vt.

440 tons (including 120 tons of joists), junior high school, Phillipsburg, N. J., Bethlehem Fabricators, Bethlehem, Pa., low bidder.

400 tons, five-span composite girder bridge, Farmington River, Farmington, Conn.; bids Nov. 12 to Hartford, Conn.

350 tons, atomic research building, Princeton, N. J., to Grand Iron Works, New York.

300 tons, six bridge structures, Southeast Expressway, Weymouth, Mass.; C. J. Maney Co. Inc., Lexington, Mass., general contractor.

280 tons, grade crossing elimination, Pennsylvania Railroad, Grove Avenue, Metuchen, N. J.; bids Nov. 29.

275 tons, addition, state hospital, Harrisburg, Pa.; bids Nov. 20.

282 tons, state bridge work, Chautauqua County, N. Y., H. L. Braughman Inc., Rochester, N. Y., low on general contract.

205 tons, state highway structures, Henry and Williams counties, Ohio, to Bethlehem Steel Co., Bethlehem, Pa., through E. K. Bridge Construction Co., Toledo, Ohio.

200 tons, two bridges, 100 tons each; Augusta and Casco-Naples, Maine.

200 tons, Mercer Island Union High School, Seattle; H. Halverson, Seattle, low base bid.

139 tons, state bridge work, Onondaga County, N. Y., Bero Construction Co., Waterloo, N. Y., low on general contract.

100 tons, repairs to fire-damaged McChord Air Base, Tacoma, Wash.; Roy T. Early Co., Tacoma, low at $464,950.

REINFORCING BARS . . .

REINFORCING BARS PLACED

1600 tons, state highway bridge work, York County, Pa., through Lycoming Construction Co., Williamsport, Pa., general contractor.

Iron Ore Statistics for September, 1957

RECEIPTS OF IRON ORE AND ORE AGGLOMERATES

(Gross tons; original sources)

Receipts	U. S. Ores L. Superior	U. S. Ores Other	Canadian Ores L. Superior	Canadian Ores Other	Other Foreign	—Total—
MONTHLY:						
U. S.	10,756,628	1,603,491	374,175	1,341,253	2,031,106	16,106,653
Canada	502,410	.....	104,392	166,660	48,160	821,622
Total	11,259,038	1,603,491	478,567	1,507,913	2,079,266	16,928,275
YEAR TO DATE:						
U. S.	63,008,041	15,531,489	2,259,539	6,532,268	16,326,000	103,658,144
Canada	3,320,334	.....	549,495	1,004,314	198,274	5,072,417
Total	66,328,375	15,531,489	2,809,034	7,536,582	16,525,081	108,730,561

STOCKS OF IRON ORE ON HAND AT END OF MONTH

(Gross tons; original sources)

At U. S. furnaces	U. S. Ores L. Superior	U. S. Ores Other	Canadian Ores L. Superior	Canadian Ores Other	Other Foreign	—Total—
DISTRICT:						
Eastern	5,634,229	234,576	340,914	2,167,041	2,651,606	11,028,366
Pitts.-Youngstown	12,913,823	63,220	701,621	2,442,937	2,934,598	19,056,199
Cleveland-Detroit	9,235,823	102,679	524,064	327,542	129,697	10,319,805
Chicago	13,249,265	(a)	(a)	.....	(a)	13,249,265
Southern	(a)	2,045,150	.....	(a)	928,154	2,973,304
Western	.....	859,220	.....	.....	.....	859,220
Furnace Total	41,033,140	3,304,845	1,566,599	4,937,520	6,644,055	57,486,159
At U. S. Docks:						
Lake Erie	4,027,686	.....	113,505	216,614	.....	4,357,805
Other docks	.....	.....	.....	(a)	(a)	(a)
Total Docks	4,027,686	.....	113,505	216,614	(a)	4,357,805
Total U. S.	45,060,826	3,304,845	1,680,104	5,154,134	6,644,055	61,843,964
Canadian:						
At furnaces	2,666,763	.....	56,769	491,979	113,389	3,328,900
Total:						
U. S. & Canada	47,727,589	3,304,845	1,736,873	5,646,113	6,757,444	65,172,864

CONSUMPTION OF IRON ORE AND ORE AGGLOMERATES

(Gross tons; original sources)

Consumption	U. S. Ores L. Superior	U. S. Ores Other	Canadian Ores L. Superior	Canadian Ores Other	Other Foreign	—Total—
U. S. Districts:						
Eastern	860,675	230,823	58,388	294,942	866,170	2,310,998
Pitts.-Youngstown	2,104,330	123,741	118,593	363,490	449,792	3,159,946
Cleveland-Detroit	1,169,095	76,851	69,856	37,415	83,935	1,437,152
Chicago	2,029,186	(a)	(a)	.....	(a)	2,029,186
Southern	(a)	754,041	.....	(a)	187,051	941,092
Western	.....	603,060	.....	.....	.....	603,060
In U. S.:						
Blast furnaces	5,336,274	1,287,586	224,061	456,721	654,245	7,958,886
Steel furnaces	193,686	101,422	865	4,197	446,123	746,293
Agglomerating plants	632,546	399,508	21,911	231,588	477,811	1,763,365
Miscellaneous	780	.....	.....	3,341	8,769	12,890
Total U. S.	6,163,286	1,788,516	246,837	695,847	1,586,948	10,481,434
In CANADA:						
Blast furnaces	221,143	.....	91,001	61,524	.....	373,668
Steel furnaces	4,302	.....	.....	4,299	13,798	22,399
Agglomerating plants	36,587	.....	28,421	27,644	3,204	95,856
Miscellaneous	45	.....	.....	.....	.....	45
Total Canada	262,077	.....	119,422	93,467	17,002	491,968
TOTAL:						
U. S. & Canada	6,425,363	1,788,516	366,259	789,314	1,603,950	10,973,402

(a) Small tonnage included in other districts to avoid disclosure.

SOURCES:—American Iron Ore Association and the American Iron & Steel Institute.

to Sweet's Steel Co., Williamsport; 2600 tons of structurals for this work went to Lehigh Structural Steel Co., Allentown, Pa.

730 tons, addition, Wilgoos Laboratory, Pratt & Whitney Aircraft Corp., Hartford, Conn., to Bethlehem Steel Co., Bethlehem, Pa.; Standard Builders Inc., Hartford, Conn., general contractor; fabricated structural steel to Whitehead & Kales, Detroit.

580 tons, office building, Southern New England Telephone Co., New Haven, Conn., to the U. S. Steel Supply Div., U. S. Steel Corp., New York; Edwin Moss & Son Inc., Bridgeport, Conn., general contractor.

475 tons, dormitories, Rhode Island School of Design, Providence, R. I., to Plantations Steel Co., Providence; E. Turgeon Construction Co., Providence, general contractor.

270 tons, service center, Consumers Power Co., Saginaw, Mich., to Truscon Steel Div., Republic Steel Corp., Detroit; Spence Bros., Saginaw, general contractor.

250 tons, Washington State overpass, Whatcom County, to Northwest Steel Rolling Mills Inc., Seattle; S. S. Mullen Inc., general contractor.

PLATES . . .

PLATES PLACED

460 tons, hull plates, General Stores Supply Office, Navy, Philadelphia, to Bethlehem Steel Co., Bethlehem, Pa.

200 tons, covered standpipe, Suffolk County Water Authority, Huntington Station, N. Y., to Graver Tank & Mfg. Co., East Chicago, Ind.

145 tons, General Stores Supply Office, Navy, Philadelphia, to U. S. Steel Corp., Pittsburgh.

PIPE . . .

CAST IRON PIPE PLACED

386 tons, 20,000 ft of 12 to 4-in., to U. S. Pipe & Foundry Co., Seattle, by Coos Bay-North Bend District, Oregon.

220 tons, 12 and 8-in., to Pacific States Cast Iron Pipe Co., Seattle, for a contractor's job at Bellingham, Wash.

Iron Ore Stocks Larger

Stocks of iron ore in the U. S. and Canada (all sources) at the end of September totaled 65,172,864 gross tons, reports the American Iron Ore Association and the American Iron & Steel Institute. The total is up substantially from the 53,906,551 tons held in September last year.

Receipts of iron ore and agglomerates totaled 16,928,275 tons in the month, compared with 17,720,801 a year ago. Receipts in the first nine months this year amounted to 108,730,561 tons, against 89,032,303 in the like period of 1956.

Consumption of iron ore in September totaled 10,973,402 tons, against 11,432,300 in the like month a year ago. Consumption in the first nine months this year was 102,070,690 tons, against 89,815,800 in the like period last year.

There were 239 blast furnaces operating on the last day of September out of a total 273 in the U. S. and Canada. This compares with 262 on the like date last year.

Detailed statistics for September are given in the accompanying table.

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Scrap Prices Are Still Sinking

Consumers' disinterest is reflected in continued sharp drop in quotations. STEEL's composite falls another $2 to $33.33. It's the lowest level since December, 1954

Scrap Prices, Page 182

Pittsburgh—Supply of scrap is dwindling as prices continue to decline. Last week, a mill on the fringe of the Pittsburgh area placed a small order for No. 1 heavy melting at $32, No. 2 heavy melting at $29, and No. 2 bundles at $26. It was the first activity locally for several weeks, and it met with some resistance. Holders of scrap are reluctant to sell it at present quotations. Some brokers say that the market has touched bottom.

On latest railroad lists, prices declined an average of $3 a ton. Prices of other grades dropped, also. Despite scattered signs of resistance to lower prices, the market needs a sharp upturn in volume to generate any strength.

Philadelphia — Light buying by district mills is resulting in further declines in prices on some steelmaking grades. No. 1 heavy melting is lower at $35.50, delivered, and No. 2 heavy melting at $32.50. No. 2 bundles are down to $26.50, delivered, and electric furnace bundles are off to $41. Heavy breakable cast is quoted down $1 at $40. Other grades are unchanged and mostly nominal.

New York—Scrap brokers have reduced prices on No. 2 bundles to $21-$22, and on 18-8 sheets, clips and solids to $155-$160. Other grades are unchanged—and for the most part untested.

Boston—Steel scrap prices may have plumbed bottom with the exception of No. 2 bundles, which are off $3 a ton to $15-$16, shipping point. Brokers' prices for the primary grades are unchanged. New buying and shipments of cast iron grades are light. Some observers are of the opinion steel scrap prices have settled to a low point and that the next move will be toward a stronger trend.

Chicago—The local scrap market is listless, with purchases at a minimum and the price level still settling. Price changes during the past week were the fewest in several.

At 80 per cent of capacity, steelmaking is at its lowest point since early November, 1954. Consumers' stocks of scrap are good, and plenty of material is available.

Cleveland—The market is off another $1 a ton on the steel grades, but quotations are nominal in the absence of representative mill buying. A small buy at Youngstown last week is setting the market pace. Some railroad No. 1 heavy melting went to a Youngstown mill last week at $36. The cast grades are weak, and prices are off on most grades.

Unprepared material is beginning to pile up in dealers' yards, but the situation here is not too bad. Other yards have curtailed operations severely.

Youngstown—The scrap market is weaker. There have been no

(*Please turn to Page* 188)

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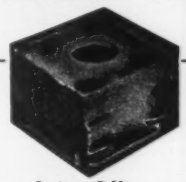
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Iron and Steel Scrap

Consumer prices per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL, Nov. 6, 1957. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Nov. 6	$33.33
Oct. 30	35.33
Oct. Avg.	37.37
Nov. 1956	61.83
Nov. 1952	43.00

Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	*31.00-32.00*
No. 2 heavy melting	*28.00-29.00*
No. 1 factory bundles	*35.00-36.00*
No. 1 dealer bundles	*31.00-32.00*
No. 2 bundles	*25.00-26.00*
No. 1 busheling	*31.00-32.00*
Machine shop turnings	*17.00-18.00*
Mixed borings, turnings	*17.00-18.00*
Short shovel turnings	*20.00-21.00*
Cast iron borings	*20.00-21.00*
Cut structurals:	
2 ft and under	*38.00-39.00*
3 ft lengths	*37.00-38.00*
Heavy turnings	*30.00-31.00*
Punchings & plate scrap	*37.00-38.00*
Electric furnace bundles	*37.00-38.00*

Cast Iron Grades

No. 1 cupola	*41.00-42.00*
Stove plate	*35.00-36.00*
Unstripped motor blocks	*28.00-29.00*
Clean auto cast	*44.00-45.00*
Drop broken machinery	*53.00-54.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*36.00-37.00*
Rails, 2 ft and under	*56.00-57.00*
Rails, 18 in. and under	*57.00-58.00*
Angles, splice bars	*50.00-51.00*
Rails, rerolling	*56.00-57.00*

Stainless Steel Scrap

18-8 bundles & solids	210.00-215.00
18-8 turnings	115.00-120.00
430 bundles & solids	95.00-100.00
430 turnings	65.00-70.00

CLEVELAND

No. 1 heavy melting	*29.00-30.00*
No. 2 heavy melting	*23.00-24.00*
No. 1 factory bundles	*32.00-33.00*
No. 1 bundles	*29.00-30.00*
No. 2 bundles	*20.00-21.00*
No. 1 busheling	*29.00-30.00*
Machine shop turnings	12.00-13.00
Short shovel turnings	16.00-17.00
Mixed borings, turnings	16.00-17.00
Cast iron borings	16.00-17.00
Cut foundry steel	34.00-35.00
Cut structurals, plates 2 ft and under	*36.00-37.00*
Low phos. punchings & plate	*30.00-31.00*
Alloy free, short shovel turnings	22.00-23.00
Electric furnace bundles	*30.00-31.00*

Cast Iron Grades

No. 1 cupola	*39.00-40.00*
Charging box cast	31.00-35.00
Heavy breakable cast	*30.00-31.00*
Stove plate	*37.00-38.00*
Unstripped motor blocks	*24.00-25.00*
Brake shoes	31.00-32.00
Clean auto cast	*38.00-39.00*
Burnt cast	29.00-30.00
Drop broken machinery	*41.00-42.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*33.00-34.00*
R.R. malleable	*50.00-51.00*
Rails, 2 ft and under	*56.00-57.00*
Rails, 18 in. and under	*57.00-58.00*
Rails, random lengths	*49.00-50.00*
Cast steel	*44.00-45.00*
Railroad specialties	*47.00-48.00*
Uncut tires	*40.00-41.00*
Angles, splice bars	*47.00-48.00*
Rails, rerolling	*55.00-56.00*

Stainless Steel
(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	205.00-210.00
18-8 turnings	90.00-95.00
430 clips, bundles, solids	75.00-80.00
430 turnings	40.00-50.00

YOUNGSTOWN

No. 1 heavy melting	*32.00-33.00*
No. 2 heavy melting	*25.00-26.00*
No. 1 bundles	*32.00-33.00*
No. 2 bundles	*25.00-26.00*
No. 1 busheling	*32.00-33.00*
Machine shop turnings	14.00-15.00
Short shovel turnings	18.00-19.00
Cast iron borings	18.00-19.00
Low phos.	*34.00-35.00*
Electric furnace bundles	*34.00-35.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*36.00-37.00*

CHICAGO

No. 1 heavy melt., indus.	*32.00-33.00*
No. 1 hvy melt., dealer	32.00-34.00
No. 2 heavy melting	29.00-30.00
No. 1 factory bundles	37.00-38.00
No. 1 dealer bundles	*33.00-34.00*
No. 2 bundles	20.00-21.00
No. 1 busheling, indus.	*35.00-36.00*
No. 1 busheling dealer	33.00-34.00
Machine shop turnings	17.00-18.00
Mixed borings, turnings	19.00-20.00
Short shovel turnings	19.00-20.00
Cast iron borings	19.00-20.00
Cut structurals, 3 ft	39.00-40.00
Punchings & plate scrap	40.00-41.00

Cast Iron Grades

No. 1 cupola	35.00-36.00
Stove plate	34.00-35.00
Unstripped motor blocks	27.00-28.00
Clean auto cast	40.00-41.00
Drop broken machinery	40.00-41.00

Railroad Scrap

No. 1 R.R. heavy melt.	37.00-38.00
R.R. malleable	45.00-46.00
Rails, 2 ft and under	49.00-50.00
Rails, 18 in. and under	50.00-51.00
Angles, splice bars	46.00-47.00
Axles	*48.00-49.00*
Rails, rerolling	*48.00-49.00*

Stainless Steel Scrap

18-8 bundles & solids	205.00-215.00
18-8 turnings	105.00-115.00
430 bundles & solids	80.00-90.00
430 turnings	50.00-55.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*20.00-21.00*
No. 2 heavy melting	18.00-19.00
No.1 bundles	*21.00-22.00*
No. 2 bundles	*17.00-18.00*
No. 1 busheling	*20.00-21.00*
Machine shop turnings	9.00-10.00
Mixed borings, turnings	10.00-11.00
Short shovel turnings	11.00-12.00
Punchings & plate scrap	26.00-27.00†

Cast Iron Grades

No. 1 cupola	34.00†
Stove plate	28.00
Charging box cast	27.00
Heavy breakable	27.00
Unstripped motor blocks	15.00†
Clean auto cast	36.00
Malleable	36.00†

†Nominal

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	39.00
No. 2 heavy melting	37.00
No. 1 bundles	39.00
No. 2 bundles	29.00
No. 1 busheling	39.00
Machine shop turnings	17.00
Short shovel turnings	19.00

Cast Iron Grades

No. 1 cupola	45.00
Charging box cast	37.00
Heavy breakable cast	37.00
Unstripped motor blocks	37.00
Brake shoes	40.00
Clean auto cast	46.00
Stove plate	39.00

Railroad Scrap

No. 1 R.R. heavy melt.	38.25
Rails, 18 in. and under	55.00
Rails, random lengths	50.00
Rails, rerolling	57.50
Angles, splice bars	49.00

PHILADELPHIA

No. 1 heavy melting	*35.50*
No. 2 heavy melting	*32.50*
No. 1 bundles	36.50
No. 2 bundles	*26.50*
No. 1 busheling	36.50
Electric furnace bundles	*41.00*
Mixed borings, turnings	23.00†
Short shovel turnings	25.00
Machine shop turnings	22.00†
Heavy turnings	32.50
Structurals & plate	45.00-47.00
Couplers, springs, wheels	54.00†
Rail crops, 2 ft & under	66.00-67.00†

Cast Iron Grades

No. 1 cupola	41.00
Heavy breakable cast	*40.00*
Malleable	59.00
Drop broken machinery	51.00-52.00

†Nominal

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	34.00-35.00
No. 2 heavy melting	29.00-30.00
No. 1 bundles	34.00-35.00
No. 2 bundles	*21.00-22.00*
Machine shop turnings	11.00-12.00
Mixed borings, turnings	13.00-14.00
Short shovel turnings	15.00-16.00
Low phos. (structurals & plate	45.00-46.00

Cast Iron Grades

No. 1 cupola	39.00-40.00
Unstripped motor blocks	32.00-33.00
Heavy breakable	33.00-34.00

Stainless Steel

18-8 sheets, clips, solids	*155.00-160.00*
18-8 borings, turnings	55.00-60.00
430 sheets, clips, solids	55.00-60.00
410 sheets, clips, solids	50.00-55.00

†Nominal

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	27.00-28.00
No. 2 heavy melting	24.00-25.00
No. 1 bundles	27.00-28.00
No. 2 bundles	*15.00-16.00*
No. 1 busheling	27.00-28.00
Machine shop turnings	10.00-11.00
Mixed borings, turnings	11.00-12.00
Short shovel turnings	12.00-13.00
No. 1 cast	33.00-34.00
Mixed cupola cast	32.00-33.00
No. 1 machinery cast	38.00-39.00

BUFFALO

No. 1 heavy melting	*32.00-33.00*
No. 2 heavy melting	*29.00-30.00*
No. 1 bundles	*32.00-33.00*
No. 2 bundles	*27.00-28.00*
No. 1 busheling	*32.00-33.00*
Mixed borings, turnings	*18.00-19.00*
Machine shop turnings	*15.00-17.00*
Short shovel turnings	*20.00-21.00*
Cast iron borings	*18.00-19.00*
Low phos.	*37.00-38.00*

Cast Iron Grades
(F.o.b. shippign point)

No. 1 cupola	*41.00-42.00*
No. 1 machinery	*46.00-47.00*

Railroad Scrap

Rails, random lengths	*44.00-45.00*
Rails, 3 ft and under	*51.00-52.00*
Railroad specialties	*37.00-38.00*

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*30.00-31.00*
No. 2 heavy melting	*25.00-26.00*
No. 1 bundles	*30.00-31.00*
No. 2 bundles	*19.00-20.00*
No. 1 busheling	*30.00-31.00*
Machine shop turnings	*16.00-17.00*
Mixed borings, turnings	18.00-19.00
Short shovel turnings	*18.00-19.00*
Cast iron borings	*18.00-19.00*
Low phos. 18 in.	*37.00-38.00*

Cast Iron Grades

No. 1 cupola	35.00-36.00
Heavy breakable cast	32.00-33.00
Charging box cast	32.00-33.00
Drop broken machinery	47.00-48.00

Railroad Scrap

No. 1 R.R. heavy melt.	36.00-37.00
Rails, 18 in. and under	*54.00-55.00*
Rails, random lengths	*46.00-47.00*

BIRMINGHAM

No. 1 heavy melting	*32.00-33.00*
No. 2 heavy melting	*28.00-29.00*
No. 1 bundles	*32.00-33.00*
No. 2 bundles	20.00-21.00
No. 1 busheling	*32.00-33.00*
Cast iron borings	*17.00-18.00*
Short shovel turnings	21.00-22.00
Machine shop turnings	20.00-21.00
Bar crops and plates	39.00-40.00
Structurals & plate	*38.00-39.00*
Electric furnace bundles	38.00-39.00
Electric furnace:	
3 ft and under	36.00-37.00
2 ft and under	37.00-38.00

Cast Iron Grades

No. 1 cupola	47.00-48.00
Stove plate	47.00-48.00
Unstripped motor blocks	36.00-37.00
Charging box cast	25.00-26.00
No. 1 wheels	*37.00-38.00*

Railroad Scrap

No. 1 R.R. heavy melt.	37.00-38.00
Rails, 18 in. and under	50.00-51.00
Rails, rerolling	*52.00-53.00*
Rails, random lengths	45.00-46.00
Angles, splice bars	43.00-44.00

SEATTLE

No. 1 heavy melting	34.00†
No. 1 bundles	32.00†
No. 2 heavy melting	32.00†
No. 2 bundles	21.00†
Machine shop turnings	26.00†
Mixed borings, turnings	26.00†
Electric furnace No. 1	35.00†

Cast Iron Grades

No. 1 cupola	35.00†
Heavy breakable cast	32.00†
Unstripped motor blocks	27.00†
Stove plate (f.o.b. plant)	25.00†

†Nominal

LOS ANGELES

No. 1 heavy melting	39.00
No. 2 heavy melting	37.00
No. 1 bundles	38.00
No. 2 bundles	*30.00*
Machine shop turnings	20.00
Shoveling turnings	25.00
Cast iron borings	25.00
Cut structurals and plate 1 ft and under	54.00

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	52.00

Railroad Scrap

No. 1 R.R. heavy melt	39.00

SAN FRANCISCO

No. 1 heavy melting	*36.00*
No. 2 heavy melting	*34.00*
No. 1 bundles	*34.00*
No. 2 bundles	*26.00*
Machine shop turnings	27.00
Mixed borings, turnings	27.00
Cast iron borings	27.00
Heavy turnings	27.00
Short shovel turnings	27.00
Cut structurals, 3 ft	*48.00*

Cast Iron Grades

No. 1 cupola	*47.00*
Charging box cast	*40.00*
Stove plate	*39.00*
Heavy breakable cast	*38.00*
Unstripped motor blocks	*36.00*
Clean auto cast	*47.00*
No. 1 wheels	*40.00*
Drop broken machinery	*47.00*

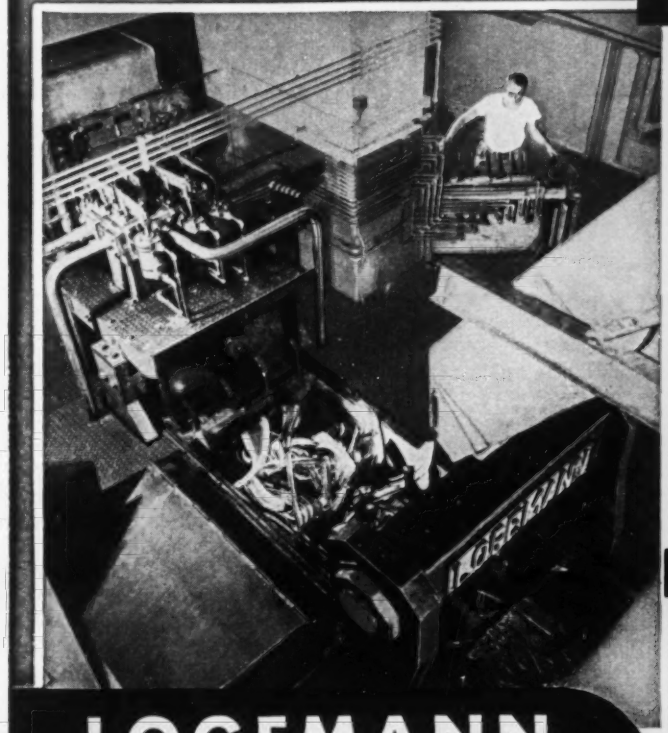
HAMILTON, ONT.

No. 1 heavy melting	*35.00*
No. 2 heavy melting	*30.00*
No. 1 bundles	*35.00*
No. 2 bundles	*25.00*
Mixed steel scrap	*30.00*
Mixed borings, turnings	*20.00*
Busheling, new factory:	
Prepared	*35.00*
Unprepared	*29.00*
Short steel turnings	*24.00*
Rails, rerolling	*43.00*

Cast Iron Grades†

No. 1 machinery cast	50.00

†F.o.b. Hamilton, Ont.



LOGEMANN Metal Balers

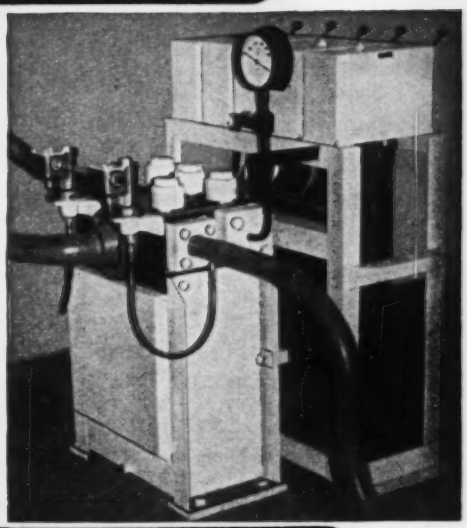
. . . powerful . . . compact . . . capable of high tonnage output!

In the large stamping plants and rolling mills where it is critically important that trim and stamping skeletons are quickly disposed of to avoid interference with production, LOGEMANN metal balers are relied on to keep ahead of production and pack such scrap into high density, self-cohering bricks for re-melting.

Hundreds of installations have established new records for tonnage, minimum maintenance, reliability, over extended periods of uninterrupted operation at high-speed.

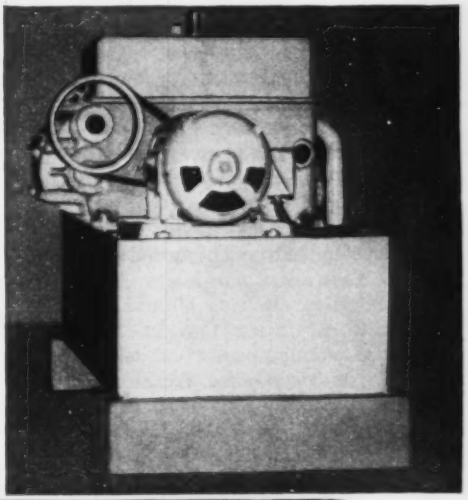
LOGEMANN models are not confined to the large sizes. Many small plants have found it profitable to use smaller sizes embodying the same features of reliability, at minimum operating cost. Interested parties are invited to write for details. Information as to the character of the scrap, tonnage to be handled in a given period of hours, and range of gauges is helpful in determining the proper model.

LOGEMANN



HYDRAULIC VALVES

The illustration shows a close-coupled hydraulic valve, operated by compressed-air cylinders for high-speed distribution of large gallonage of fluid at high pressure. LOGEMANN engineers have designed and built valves for many unusual as well as standard applications, and will welcome inquiries, with an outline of the conditions and requirements.



HYDRAULIC PUMPS

The opposed-cylinder close-coupled double pressure pump shown in the illustration is mounted on an individual tank to conserve floor space under present crowded plant and operating conditions. When requesting details, please indicate the nature of the service, pressure and gallonage requirements, and the fluid to be handled.

LOGEMANN BROTHERS CO.

3126 W. BURLEIGH STREET • MILWAUKEE 10, WISCONSIN

Aluminum Exports To Rise

Major producers see development of foreign markets as one solution to pepping up sales. Magnesium ingot production to set record this year. Some price slashing in zinc reported

Nonferrous Metal Prices, Pages 186 & 187

DOMESTIC producers of aluminum are casting an appraising eye at the foreign market as a potential outlet for the industry's increasing production.

Primary producers have not exploited the foreign market for two reasons: 1. Domestic demand has taken almost all its production. 2. Exports have been restricted by the government.

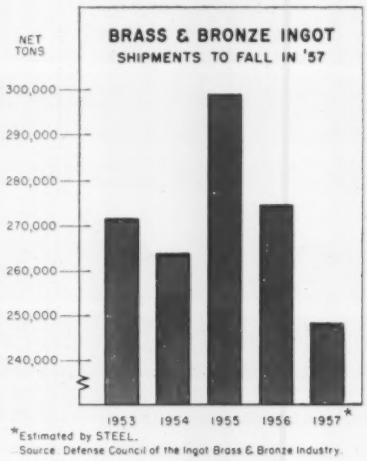
For the first time in its history, the domestic industry is producing more metal than it can sell. The expanding industrial capacity of other nations offers one solution to the disposal of surplus stocks, many industry people believe.

Example—Reynolds Metals Co. recently formed an export subsidiary (Reynolds International Inc.) to handle its manufacturing and sales activities outside the U. S. Reynolds has plants in seven countries, plus tie-ups with local producers and fabricators in several other overseas areas. Recent developments: 1. Formation of an Australian subsidiary. 2. Partnership in an Irish aluminum foil mill. 3. Formation of an aluminum manufacturing and sales company in the United Kingdom. 4. Joint ownership in a West German tube mill.

Kaiser Aluminum & Chemical Corp. sees a future in exports, too, even though they account for only about 1 per cent of sales now. Kaiser's foreign sales setup differs from Reynolds' in that it works through independent agents rather than subsidiary companies. But Ray G. Boyd, general manager of Kaiser's International Div., say it's quite possible that foreign offices will be opened later.

Aluminum Co. of America plans to step up its export program in view of increasing demand from overseas. Alcoa has affiliated fabricating companies in Mexico and Venezuela. It also has sales representation in about 20 other countries, mostly by independent manufacturers' agents.

Where—Latin America offers the biggest potential for exports, Kaiser believes. "Western Europe also will be an important market area, and the Far East, Near East, and Africa are developing rapidly as consumers of aluminum in all forms," says Mr. Boyd. Alcoa sees the greatest potential in Latin America and Europe, says John Wilson, export division manager.



*Estimated by STEEL.
Source: Defense Council of the Ingot Brass & Bronze Industry

What products will be in greatest demand overseas?

Says Mr. Boyd: "In growing industrial areas, there's an excellent market for fabricated items like electric conductor cable. In more established industrial regions, like Europe, our best opportunity is in the sale of primary metal." Alcoa believes sheets, pig, and cable will be in greatest demand.

Mag To Set Record

Magnesium ingot production in 1957 will be the highest in any peacetime year. Monthly totals are running well ahead of 1956's. In the first nine months of this year, 61,118 tons were produced, compared with 46,573 tons in the same period of 1956. Total production this year should hit 80,000 tons, says the Magnesium Association, New York.

The outlook's not too bright in other areas. Fabricators are just about holding their own with last year's pace. Castings may be as much as 10 per cent below the 1956 figure by yearend.

Aluminum Forecasts

Aluminum shipments in 1958 will increase 5 to 10 per cent over 1957's, predicts Donovan Wilmot, Aluminum Co. of America vice president. Mr. Wilmot also believes aluminum consumption this year will be about 5 per cent under the 1956 figure.

Alcoa's manager of distribution, H. T. Wilder, predicts domestic consumption will double by 1965 (STEEL estimates 1957 consumption in the U. S. at around 2 million tons). The forecast is backed

NONFERROUS PRICE RECORD

	Price Nov. 6	Last Change	Previous Price	Oct. Avg	Sept. Avg	Nov., 1956 Avg
Aluminum ..	26.00	Aug. 1, 1957	25.00	26.000	26.000	25.000
Copper	25.50–27.00	Oct. 15, 1957	26.00–27.00	26.361	26.469	35.956
Lead	13.30	Oct. 14, 1957	13.80	13.504	13.800	15.800
Magnesium .	35.25	Aug. 13, 1956	33.75	35.250	35.250	35.250
Nickel	74.00	Dec. 6, 1956	64.50	74.000	74.000	64.500
Tin	89.50	Nov. 6, 1957	89.75	91.843	93.422	111.049
Zinc	10.00	July 1, 1957	10.50	10.000	10.000	13.500

Quotations in cents per pound based on: COPPER, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary pig, 99.5+%, deld.; MAGNESIUM, pig, 99.8%, Velasco, Tex.

up by a University of Illinois professor, James E. Rosenzweig, who sees 1965 consumption at 4.2 million tons. Professor Rosenzweig breaks down major uses in 1965 like this: Building materials, 1 million tons; transportation equipment, 750,000 tons; direct military uses, 400,000 tons; consumer durable goods, 350,000 tons; electrical applications, 350,000 tons; containers and packaging, 250,000 tons.

Tariff Loophole

The U. S. Tariff Commission is expected to act shortly to protect domestic lead and zinc producers from imports of pig lead and slab zinc by raising tariffs. But the anticipated action of the commission would give no additional protection against imports of fabricated products.

Foreign makers could still undersell American producers on such items as lead pipe, sheets, shot, wire, and babbitt, and zinc sheets and rolled products.

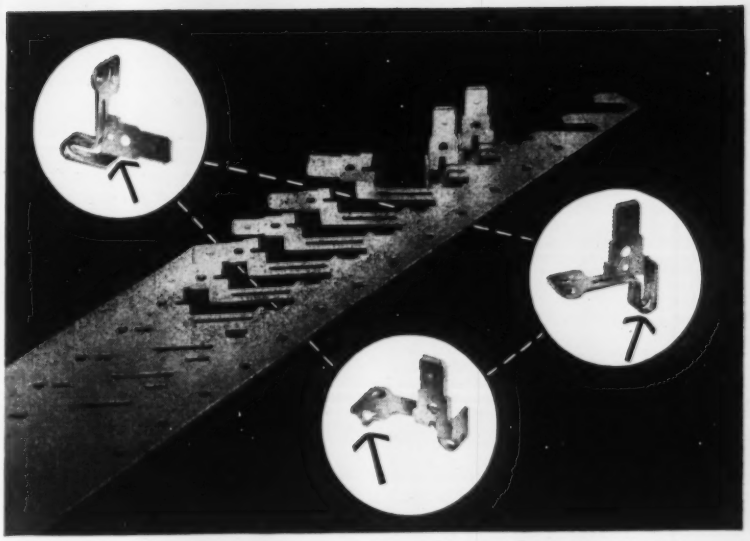
If the lead and zinc tariff is increased, look for a stepup in shipments of fabricated products from overseas producers.

Zinc: Price Slashing

Rumors of price cutting by zinc producers continue. The zinc die-cast alloy grade is reported to be selling at 13.50 to 13.75 cents a pound. At the 13.50 cent level, it is only 1.75 cents a pound over the special high grade price (11.75 cents). Other zinc premiums are being hard pressed by imports and slack demand.

Market Memos

- Aluminium Ltd. has postponed part of its expansion program because of the slackoff in demand. Says Nathaniel V. Davis, president: "This latest adjustment in expansion plans is expected to reduce our capital expenditures by about $30 million during 1958-59."
- Anaconda Co. will acquire the Cochran Foil Co. of Louisville, manufacturer of aluminum foil.
- The International Tin Council estimates 1957's surplus supply of tin will be about 12,500 tons.



Cut costs on tough forming jobs with Elephant Brand® fine grain phosphor bronze

Automatic metal-forming machines operate best when they are fed materials of uniform, dependable quality. To shape critical details like those shown on these switch parts, many manufacturers rely on Seymour ELEPHANT BRAND phosphor bronze. Its fine grain permits making sharp bends, severe draws and other complex forming operations with a minimum of rejections or tooling adjustments.

Seymour ELEPHANT BRAND combines in one fine grain phosphor bronze alloy, high ductility, great strength, uniform temper, long fatigue life, and fine finish. These qualities prompt discerning users to say:—"Specify Seymour ELEPHANT BRAND . . . there's no finer phosphor bronze!"

ALL ELEPHANT BRAND phosphor bronze is fine grain

The first phosphor bronze produced in the U.S. was ELEPHANT BRAND. Made by a carefully guarded process which insures the highest degree of purity and uniformity, it has a grain structure of very fine, uniform crystals free from segregation, coring or residual dendritic structure. Thus, ELEPHANT BRAND is a quality standard as well as a trade-mark for the original and finest phosphor bronze.

Your Seymour Representative is trained to help you solve metals problems. Why not call him today?

THE SEYMOUR MANUFACTURING COMPANY

3 FRANKLIN ST., SEYMOUR, CONNECTICUT

Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99.5%, pigs, 26.00; ingots, 28.10, 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 29.90; No. 43, 29.70; No. 195, 31.30; No. 241, 31.50; No. 356, 29.90, 30-lb ingots.

Antimony: R.M.M. brand, 99.5%, 33.00; Lone Star brand, 33.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 27.50-28.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97% lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $74.75 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.25% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment data, f.o.b. shipping point.

Bismuth: $2.25 per ton, ton lots.

Cadmium: Sticks and bars, $1.70 per lb deld.

Cobalt: 97-99%, $2.00 per lb for 550-lb keg; $2.02 per lb for 100 lb case; $2.07 per lb under 100 lb.

Columbium: Powder, $120 per lb, nom.

Copper: Electrolytic, 27.00 deld.; custom smelters, 25.50-26.00; lake, 27.00 deld.; fire refined, 26.75 deld.

Germanium: First reduction, $179.17-197.31 per lb; intrinsic grade, $197.31-220 per lb, depending on quantity.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $86-110 nom. per troy oz.

Lead: Common, 13.30; chemical, 13.40; corroding, 13.40, St. Louis. New York basis, add 0.20.

Lithium: 98 + %, 50-100 lb, cups or ingots $12; rod, $15; shot or wire, $16. 100-500 lb, cups or ingots, $10.50; rod, $14; shot or wire, $15, f.o.b. Minneapolis.

Magnesium: Pig, 35.25; ingot, 36.00 f.o.b. Velasco, Tex.; 12 in. sticks, 59.00 f.o.b. Madison, Ill.

Magnesium Alloys: AZ91A (diecasting), 40.75 deld.; AZ63A, AZ92A, AZ91C (sand casting), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $230-233 per 76-lb flask.

Molybdenum: Unalloyed, turned extrusions, 3.75-5.75 in. round, $9.60 per lb in lots of 2500 lb or more, f.o.b. Detroit.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 78.25; "XX" nickel shot, 79.50; "F" nickel shot for addition to cast iron, 74.50; "F" nickel 5 lb ingots in kegs for addition to cast iron, 75.50. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.01. Nickel oxide sinter, 71.25 per lb of nickel content before 1 cent freight allowance, f.o.b. Copper Cliff, Ont.

Osmium: $80-100 per troy oz nom.

Palladium: $21-24 per troy oz.

Platinum: $81-87 per troy oz from refineries.

Radium: $16-21.50 per mg radium content, depending on quantity.

Rhodium: $118-125 per troy oz.

Ruthenium: $45-55 per troy oz.

Selenium: $10.50 per lb, commercial grade.

Silver: Open market, 90.625 per troy oz.

Sodium: 16.50, c.l.; 17.00 l.c.l.

Tantalum: Rod, $60 per lb; sheet, $55 per lb.

Tellurium: $1.65-1.85 per lb.

Thallium: $12.50 per lb.

Tin: Straits, N. Y., spot and prompt, 89.50.

Titanium: Sponge, 99.3+%, grade A-1 ductile (0.3% Fe max.), $2.25; grade A-2 (0.5% Fe max.), $2.00 per lb.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $3.50 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00; 99+% hydrogen reduced, $4.10-4.20.

Zinc: Prime Western, 10.00; brass special, 10.25; intermediate, 10.50, East St. Louis, freight allowed over 0.50 per lb. New York basis, add 0.50. High grade, 11.35; special high grade, 11.75 deld. Die casting alloy ingot No. 3, 14.25; No. 2, 15.25; No. 5, 14.75 deld.

Zirconium: Sponge, commercial grade, $5-10 per lb.

(Note: Chromium, manganese, and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 23.75-30.25; No. 12 foundry alloy (No. 2 grade), 21.75-23.00; 5% silicon alloy, 0.60 Cu max., 25.50-26.00; 13 alloy, 0.60 Cu max., 25.50-26.00; 195 alloy, 24.75-26.75; 108 alloy, 22.25-23.00. Steel deoxidizing grades, notch bars, granulated or shot; Grade 1, 23.75; grade 2, 22.00; grade 3, 20.75; grade 4, 19.00.

Brass Ingot: Red brass, No. 115, 26.75; tin bronze, No. 225, 36.00; No. 245, 30.25; high-leaded tin bronze, No. 305, 30.75; No. 1 yellow, No. 405, 22.00; manganese bronze, No. 421, 24.50.

Magnesium Alloy Ingot: AZ63A, 40.75; AZ91B, 37.25; AZ91C, 40.75; AZ92A, 40.75.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.82, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.80, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 30,000-lb lots, 32.355; l.c.l., 32.98. Weatherproof, 30,000-lb lots, 33.66; l.c.l., 34.78. Magnet wire deld., 40.43, before quantity discounts.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $19.00 per cwt; pipe, full coils, $19.00 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheets and strip, $9.50-15.95; sheared mill plate, $8.00-11.50; wire, $7.50-11.50; forging billets, $6.00-7.60; hot-rolled and forged bars, $6.15-7.90.

ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, 24.00; ribbon zinc in coils, 20.50; plates 19.00.

ZIRCONIUM

Plate, $12.50-19.20; H.R. strip, $12.50-22.90; C.R. strip, $15.00-31.25; forged or H.R. bars, $11.00-17.40.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	126	106	128
Strip, C.R.	124	108	138
Plate, H.R.	120	105	121
Rod, Shapes, H.R.	107	89	109
Seamless Tubes	157	129	200

ALUMINUM

Sheets: 1100 and 3003 mill finish (30,000 lb base; freight allowed).

Thickness Range Inches	Flat Sheet	Coiled Sheet
0.249-0.136	43.10-47.60	.....
0.135-0.096	43.60-48.70	40.50-41.10
0.095-0.077	44.30-50.50	40.60-41.30
0.076-0.061	44.90-52.80	40.80-42.00
0.060-0.048	45.60-55.10	41.40-43.10
0.047-0.038	46.20-57.90	41.90-44.50
0.037-0.030	46.60-62.90	42.30-46.30
0.029-0.024	47.20-54.70	42.60-47.00
0.023-0.019	48.20-58.10	43.70-45.40
0.018-0.17	49.00-55.40	44.30-46.00
0.016-0.015	49.90-56.30	45.10-46.80
0.014	50.90	46.10-47.80
0.013-0.012	52.10	46.80
0.011	53.10	48.00
0.010-0.0095	54.60	49.40
0.009-0.0085	55.90	50.90
0.008-0.0075	57.50	52.10
0.007	59.00	53.60
0.006	60.60	55.00

ALUMINUM (continued)

Plates and Circles: Thickness 0.250-3 in., 24-60 in. width or diam., 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	42.70	47.50
5050-F	43.80	48.60
3004-F	44.80	50.50
5052-F	45.40	51.20
6061-T6	46.90	53.00
2024-T4*	50.60	57.40
7075-T6*	58.40	66.00

*24-48 in. width or diam., 72-180 in. lengths.

Screw Machine Stock: 30,000 lb base.

Diam. (in.) or across flats	——Round—— 2011-T3	2017-T4	—Hexagonal— 2011-T3	2017-T4
Drawn				
0.125	78.20	75.20	....	....
0.156-0.172	66.20	63.40	....	....
0.188	66.20	63.40	....	81.60
0.219-0.234	63.00	61.50	....	....
0.250-0.281	63.00	61.50	....	77.90
0.313	63.00	61.50	....	74.20
0.344	62.50	....	....	....
Cold-Finished				
0.375-0.547	62.50	61.30	74.80	69.80
0.563-0.688	62.50	61.30	71.10	65.50
0.719-1.000	61.00	59.70	64.90	61.70
1.063	61.00	59.70	....	59.60
1.125-1.500	58.60	57.40	62.80	59.60
Rolled				
1.563	57.00	55.70	....	....
1.625-2.000	56.30	54.90	....	57.50
2.125-2.500	54.80	53.40	....	....
2.563-3.375	53.20	51.70	....	....

Forging Stock: Round, Class 1, 45.20-58.60 in specific lengths, 36-144 in., diam. 0.375-8 in. Rectangles and squares, Class 1, 50.50-66.60 in random lengths, 0.375-4 in. thick, width 0.750-10 in.

Pipe: ASA schedule 40, alloy 6063-T6, standard lengths, plain ends, 90,000-lb base, per 100 ft.

Nom. Pipe Size (in.)		Nom. Pipe Size (in.)	
¾	$19.40	2	$ 59.90
1	30.50	4	165.05
1¼	41.30	6	296.10
1½	49.40	8	445.55

Extruded Solid Shapes:

Factor	Alloy 6063-T5	Alloy 6062-T6
9-11	45.40-47.00	60.60-64.80
12-14	45.70-47.20	61.30-65.80
15-17	45.90-47.90	62.50-67.50
18-20	46.50-48.30	64.50-70.10

MAGNESIUM

Sheet and Plate: AZ31B standard grade, 0.32 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.0 in., 67.90. AZ31B spec. grade, .032 in., 171.30; .081 in., 108.70; .125 in., 98.10; .188 in., 95.70; .250-2.00 in., 93.30. Tread plate, 60-192 in. lengths, 24-72 in. widths; .125 in., 74.90; .188 in., 71.70-72.70; .25-.75 in., 70.60-71.60. Tooling plate, .25-3.0 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
6-8	69.60-72.40	84.60-87.40
12-14	70.70-73.00	85.70-88.00
24-26	75.60-76.30	90.60-91.30
36-38	89.20-90.30	104.20-105.30

NONFERROUS SCRAP

DEALER'S BUYING PRICES

(Cents per pound, New York, in ton lots.) Aluminum: 1100 clippings, 13.50-14.00; old sheets, 10.50-11.00; borings and turnings, 6.50-

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES f		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tubes	Clean Heavy	Rod Ends	Clean Turnings
Copper	50.13b	47.36c	....	50.32	23.000	23.000	22.250
Yellow Brass	44.02	32.30d	44.56	46.93	17.375	17.125	15.750
Low Brass, 80%	46.50	46.44	47.04	49.31	19.500	19.250	18.750
Red Brass, 85%	47.37	47.31	47.91	50.18	20.250	20.000	19.500
Com. Bronze, 90%	48.78	48.72	49.32	51.34	21.000	20.750	20.000
Manganese Bronze	52.01	46.11	56.61	....	16.125	15.875	15.375
Muntz Metal	46.39	42.20	....	....	16.375	16.125	15.625
Naval Brass	48.27	42.58	55.33	51.68	16.125	15.875	15.375
Silicon Bronze	54.76	53.95	54.80	56.74e	22.625	22.375	21.625
Nickel Silver, 10%	60.43	62.75	62.75	....	23.625	23.375	11.813
Phos. Bronze, A-5%	69.07	69.57	69.57	70.75	23.750	23.500	22.500

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, or any or all kinds of scrap, add 1 cent per lb.

7.00; crankcases, 10.50-11.00; industrial castings, 10.50-11.00.

Copper and Brass: No. 1 heavy copper and wire, 18.50-19.00; No. 2 heavy copper and wire, 16.50-17.00; light copper, 15.00-15.50; No. 1 composition red brass, 15.50-16.00; No. 1 composition turnings, 15.00-15.50; new brass clippings, 13.00-13.50; light brass, 9.00-9.50; heavy yellow brass, 11.00-11.50; new brass rod ends, 12.00-12.50; auto radiators, unsweated, 11.50-12.00; cocks and faucets, 12.00-12.50; brass pipe, 12.50-13.00.

Lead: Heavy, 8.50-9.00; battery plates, 4.00-4.25; linotype and stereotype, 11.50-11.75; electrotype, 10.50-10.75; mixed babbitt, 11.00-11.50.

Monel: Clippings, 33.00-34.00; old sheets, 31.00-32.00; turnings, 23.00-24.00; rods, 33.00-34.00.

Nickel: Sheets and clips, 50.00-55.00; rolled anodes, 50.00-55.00; turnings, 45.00-50.00; rod ends, 50.00-55.00.

Zinc: Old zinc, 3.00-3.25; new diecast scrap, 2.75-3.00; old diecast scrap, 1.50-1.75.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Aluminum: 1100 clippings, 16.50-17.50; 3003 clippings, 16.50-17.50; 6151 clippings, 16.00-17.50; 5052 clippings, 16.00-17.00; 2014 clippings, 15.50-17.00; 2017 clippings, 15.50-17.00; 2024 clippings, 15.50-17.00; mixed clippings, 15.00-16.00; old sheets, 13.50; old cast, 13.50; clean old cable (free of steel), 16.00-16.50; borings and turnings, 13.50-15.00.

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 53.00; light scrap, 48.00; turnings and borings, 33.00.

Copper and Brass: No. 1 heavy copper and wire, 21.75; No. 2 heavy copper and wire, 20.25; light copper, 18.00; refinery brass (60% copper) per dry copper content, 19.50.

INGOTMAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

Copper and Brass: No. 1 heavy copper and wire, 21.75; No. 2 heavy copper and wire, 20.25; light copper, 18.00; No. 1 composition borings, 18.75; No. 1 composition solids, 19.25; heavy yellow brass solids, 13.00; yellow brass turnings, 12.00; radiators, 15.25.

PLATING MATERIALS

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.70 per lb.

Copper: Flat-rolled, 45.29; oval, 43.50, 5000-10,000 lb; electrodeposited, 35.75, 2000-5000 lb lots; cast, 36.25, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, 114.25; 100-499 lb, 112.00; 500-4999 lb, 107.50; 5000-29,999 lb, 105.25; 30,000 lb, 103.00. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab, less than 200 lb, 108.5; 200-499 lb, 107.00; 500-999 lb, 106.50; 1000 lb or more, 106.00.

Zinc: Balls, 17.50; flat tops, 17.50; flats, 19.25; ovals, 18.50, ton lots.

CHEMICALS

Cadmium Oxide: $1.70 per lb in 100-lb drums.
Chromic Acid: 100 lb, 33.30; 500 lb, 32.80; 2000 lb, 32.15; 5000 lb, 31.80; 10,000 lb, 31.30; f.o.b. Detroit.
Copper Cyanide: 100-200 lb, 71.60; 300-900 lb, 69.60.
Copper Sulphate: 100-1900 lb, 14.55; 2000-5900 lb, 12.55; 6000-11,900 lb, 12.30; 12,000-22,900 lb, 12.05; 23,000 lb or more, 11.55.
Nickel Chloride: Less than 400 lb, 35.00; 400-9990 lb, 33.00; 10,000 lb, 32.50.
Nickel Sulphate: 5000-22,000 lb, 33.50; 23,000-35,900 lb, 33.00; 36,000 lb or more, 32.50.
Sodium Cyanide: 100 lb, 27.60; 200 lb, 25.90; 400 lb, 22.90; 1000 lb, 21.90; f.o.b. Detroit.
Sodium Stannate: Less than 100 lb, 73.20; 100-600 lb, 64.20; 700-1900 lb, 61.50; 2000-9900 lb, 59.60; 10,000 lb or more, 58.30.
Stannous Chloride (anhydrous): Less than 25 lb, 162.20; 25 lb, 127.20; 100 lb, 112.20; 400 lb, 109.80; 5200-19,600 lb, 97.60; 20,000 lb or more, 85.40.
Stannous Sulphate: Less than 50 lb, 125.20; 50 lb, 95.20; 100-1900 lb, 93.20; 2000 lb or more, 91.20.
Zinc Cyanide: 100-200 lb, 59.00; 300-900 lb, 57.00.

STEEL PLANT ENGINEER

A graduate Mechanical Engineer is needed to fill a permanent position in our Plant Engineering Department at Fontana.

This opportunity is available for an outstanding engineer whose experience includes the design, maintenance, construction and layout of rolling mills and steel making facilities.

If your qualifications meet these requirements, send complete resume with salary requirements to

Employment Manager

KAISER STEEL CORP.

P. O. Box 217

Fontana, California

CLASSIFIED

Help Wanted

CLEANING ROOM SUPERINTENDENT: Must have supervisory experience and be completely familiar with all phases of cleaning room operations for a miscellaneous steel jobbing foundry producing castings up to 10,000 pounds. Excellent opportunity for an aggressive qualified man with a modern and progressive foundry located in the Middle West producing 600-700 tons per month. Advise full particulars including salary requirements. Box 603, STEEL, Penton Bldg., Cleveland 13, Ohio.

PRINCIPAL CORROSION ENGINEER: Study of the fundamentals of corrosion relating to ferrous metal in environmental media of liquid metals, aqueous solutions and gases. Applicant should be Ph. D. grade or 3 to 5 years experience in corrosion technology. Salary commensurate with ability. Located Western Pennsylvania. Replies confidential. Reply Box 615, STEEL, Penton Bldg., Cleveland 13, Ohio.

METALLURGIST: HIGH TEMPERATURE RESEARCH. Opening for Research Metallurgist with experience in elevated temperature field. Basic research and evaluation of high temperature alloys. Many fringe benefits including opportunity for additional university training. Location research institute Western Pennsylvania. All replies confidential. Reply Box 614, STEEL, Penton Bldg., Cleveland 13, Ohio.

PHYSICIST: Ph. D. or equivalent with magnetic and metallurgical interest and experience in either alloy or powder and sintered magnets. Long term research. Location Western Pennsylvania. Salary commensurate with ability. Reply Box 616, STEEL, Penton Bldg., Cleveland 13, Ohio.

PHYSICIST: Ph. D. or equivalent. Primary interest in X-ray diffraction. Long range study of preferred orientation of polycrystalline materials. Location Western Pennsylvania. Reply Box 617, STEEL, Penton Bldg., Cleveland 13, Ohio.

Save on Your INDUSTRIAL TRACK

FOSTER *QUALITY* **RELAYING RAILS**

FULLY GUARANTEED

Handle more cars better—cost less to install and maintain. Foster stocks all Rail Sections 12# thru 175#, Switch Material and Track Accessories.

SEND FOR CATALOGS

RAILS · TRACK EQUIPMENT · PIPE · PILING

L B FOSTER co.

PITTSBURGH 30 • NEW YORK 7 • CHICAGO 4
ATLANTA 3 • HOUSTON 2 • LOS ANGELES 5

FOR SALE — 1 Model 15 Bell Prime Mover, Serial #3433 complete with bucket and dual tires. Used very little and in excellent condition. Sale price $350.00.

FOR SALE—1 Chicago Pneumatic Compressor Serial #10155. Size 8 x 8 with capacity of 150 CFM. Complete with 25 HP Wagner motor. 1150 RPM. 3 Phase. 60 Cycle. 220/440 Volt. Serial #7311644. Compressor and motor in excellent condition. Total price $400.00.

THUNDER BAY MFG. CORP.
P. O. Box 317 Alpena, Michigan

SPECIALTY STEEL SALES OPPORTUNITY FOR CALIFORNIA AREA

Eastern steel firm specializing in special alloy maintenance steels has openings for sales personnel in new California plant, which includes draw against commission and protected territory for experienced specialty steel salesmen and salesmen with industrial selling experience and following.

Please send complete resume for positions to commence the first of the year. Our men know of this ad.

Write Box 619, STEEL
Penton Bldg., Cleveland 13, Ohio

STEEL SALES OPPORTUNITIES

Salesmen with specialty steel sales experience for the following available territories: Chicago; Toronto, Canada; Baltimore; Houston; Birmingham; Milwaukee; and Minneapolis.

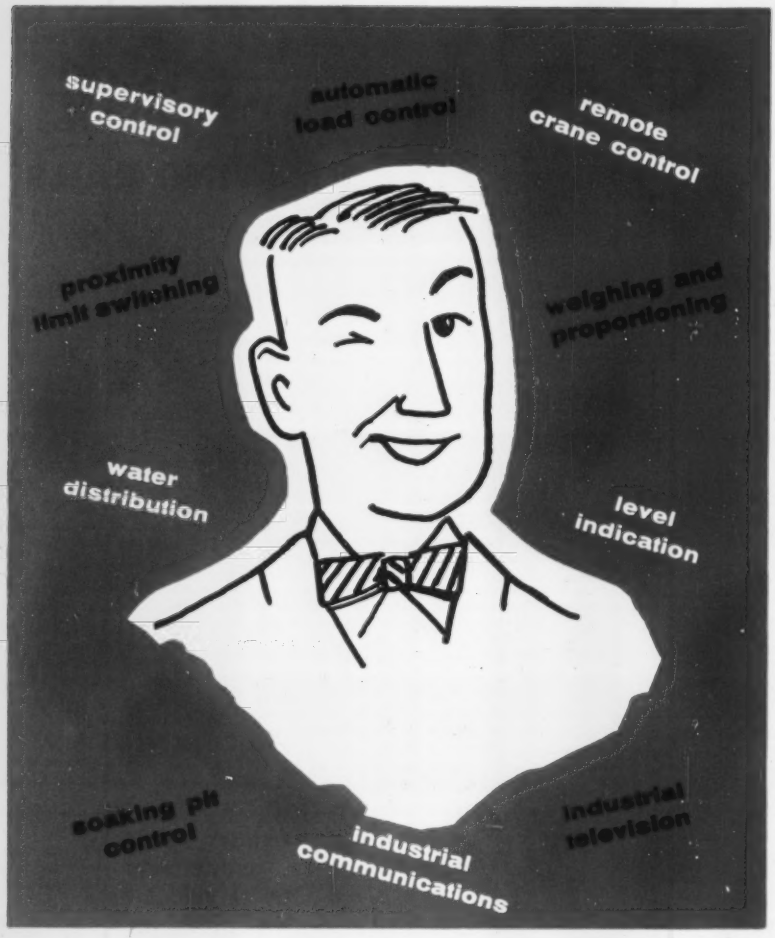
Also, Manufacturers' Representatives with industrial following. Good commission, exclusive territory. Our men know of this ad. Write for full information.

Box 618, STEEL
Penton Bldg. Cleveland 13, Ohio

TO FIND THE MAN YOU NEED

Let STEEL's classified columns do the job for you. STEEL reaches all types of executives in the metalworking industry. Plan now to reach the highly-trained men you want by means of an advertisement in the "classifieds." For rates, write STEEL, Penton Building, Cleveland 13, Ohio.

A Femco Sales Engineer is a good man to know!



With standard components, Femco provides simple, low-cost solutions of control and indication problems.

Femco engineers have developed a line of standard components, with which many different systems can be designed to provide *automatic remote control, indication, monitoring, inter-communication* or *televised observation.*

The way to find out how you can profit with a Femco system, is to get acquainted with your nearest Femco sales engineer. Phone or write for an appointment.

UNDERHILL 3-3200 **Femco, Inc.** IRWIN, PA.

COMMUNICATION • *Electronic Engineers* • AUTOMATION

MAKERS OF THE FAMOUS FEMCO TROLLEYPHONE

(*Concluded from Page* 181)

representative orders for some time past, and dealers think there will be none for some time to come.

Cincinnati—Prices on the principal steelmaking grades dropped $3 a ton last week, but some limited mill buying was reported. No. 1 heavy melting dipped $3 to $30-$31, brokers' buying price.

Detroit—Scrap prices are down, and may go still lower. Some juggling of quotations is going on, but lack of purchases makes current market activity a guessing game among dealers and brokers.

The last bids were not split, and most of the bundles sold on October lists apparently are scheduled for water shipment to Bethlehem Steel Co.'s Lackawanna (N. Y.) plant.

Buffalo—Scrap prices declined as much as $5.50 a ton last week on new mill orders for November delivery. A leading consumer paid $30 for No. 2 heavy melting, off $5.50, and $28 for No. 2 bundles, down $4.50. No. 1 heavy melting fell to $32-$33, down $4.

Blast furnace scrap was cut as much as $3. Other specialties also declined, including low phos at $38, random rails at $45, and railroad specialties at $38. Cast scrap dropped $1.

Birmingham — Except for the cast iron grades, there is little scrap moving here. Only nominal orders for cast are being received. Brokers attribute the small volume to production cutbacks and large inventories. Some dealers with high-priced inventories are refusing to sell at current prices.

Seattle — Scrap continues depressed. Sales are lacking and current prices are nominal. Receipts are light. The export market is quiet. Japanese importers are reported planning a meeting at which they will consider future buying policy. At present Japan needs scrap but lacks adequate credit.

Los Angeles—The scrap market undertone is soft, but prices are holding at the recently reduced level. Mill purchases are practically nil and export business is at a standstill.

San Francisco — Steel scrap prices are expected to fall an average of $2 a ton when the mills make new postings shortly.

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RUSHING THE GROWLER

Those were the days — down to the corner saloon, at the side entrance, you could bring a pail, bucket, or pitcher, and have it filled with cool draft beer — that was "rushing the growler," a real treat back in 1907. If you preferred you could buy good 7-year old bourbon whiskey by mail order for only $3.20 for *four full quarts*. Or if you lived in a "dry" area, you drank patent medicine — for your "health" — that might contain up to 47% alcohol.

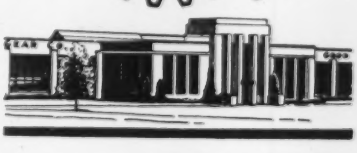
Dreaming of the "good old days" is a popular pastime, but it's not at all entirely realistic. There have been many changes since 1907 that we tend to lose sight of; diversions in 1907 were fewer than today — and there was less time to be diverted in! Products have changed too — and most have changed for the better. Gears are an excellent example; the progress in the design, quality and manufacture of gears in the past 50 years has been remarkable. This progress is continuing today at an ever-increasing tempo, providing an important reason for choosing your custom gear source with care — for choosing a firm with demonstrable ability to keep in the forefront of this progress. A firm, in short, with a record like Cincinnati Gear.

THE CINCINNATI GEAR CO.

CINCINNATI 27, OHIO

Fifty Years of "Gears — Good Gears Only"

CINTI



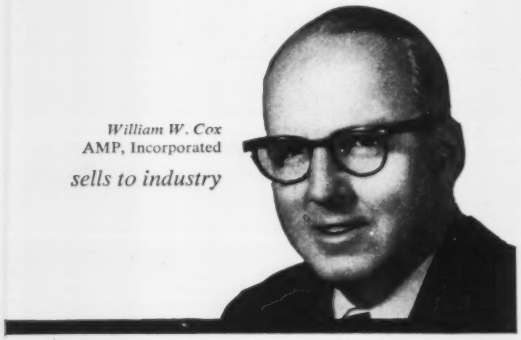
Can specialized business publication advertising actually sell?

By reputation, salesmen are reluctant to credit anything but their own selling efforts for getting names on the dotted line.

Actually, it's quite a different story. The most successful salesmen will tell you two important things about selling. 1. That the selling process is largely a matter of communicating ideas. 2. And that specialized business publication advertising can help importantly to register information with prospects.

Of course each salesman will express this in his own way . . . but they all agree that selling would be far more difficult without the advertising that appears in the industrial, trade, and professional publications that serve the specialized markets to which they sell.

Here, for instance, is what a salesman has to say about this kind of advertising:



William W. Cox
AMP, Incorporated
sells to industry

Says Mr. Cox:

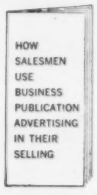
"The quickest way we can introduce a product is by introducing it through advertising in business papers. That way we get it around faster than we can by word of mouth alone. On occasion my home office has inquiries out to me before I can get to the customer or prospect to introduce a new product. They've already seen it in a trade magazine.

"It's interesting to note that within the last two weeks I received a survey which shows about 80% of the new customers we get on our books come through our trade publication advertising. Of course, our company is only 15 years old and we have grown from what you might say, *nothing*, to the biggest in our business. Certainly a lot of that has come from our advertising campaigns. Our name is known throughout the world right now, purely because of our advertising program. When I go to a prospect now, they know my company, they know my product . . . it makes my job easier, and opens doors when I have to make cold calls."

Ask your own salesmen what your company's business publication advertising does for them. If their answers are generally favorable you can be sure that your business publication advertising is really helping them sell. If too many answers are negative it could well pay you to review your advertising objectives—and to make sure the publications that carry your advertising are read by the men who must be sold.

How salesmen use their companies' advertising to get more business

Here's a useful and effective package of ideas for the sales manager, advertising manager or agency man who would like to get more horsepower out of his advertising. Send for a free copy of the pocket size booklet entitled, "How Salesmen Use Advertising in Their Selling," which reports the successful methods employed by eleven salesmen who tell how they get more value out of their companies' advertising.



You'll find represented many interesting variations in how they do this. Some are very ingenious; all are effective. You can be sure that more of your salesmen will use your advertising after they read how others get business through these simple methods.

The coupon is for your convenience in sending for your free copy. Then, if you decide you want to provide your salesmen with additional copies, they are available from NBP Headquarters in Washington, at twenty-five cents each. Or if you choose you can reprint the material yourself and distribute it as widely as you please. But first, send for your free copy.

NATIONAL BUSINESS PUBLICATIONS, INC.
Department 4D
1413 K Street, N. W.
Washington 5, D. C. **STerling 3-7533**

Please send me a free copy of the NBP booklet "How Salesmen Use Advertising in Their Selling."

Name _____

Title _____

Company _____

Street Address _____

City _____ Zone _____ State _____

National Business Publications, Inc.

NBP

. . . each of which serves a specialized market in a specific industry, trade or profession.

You get automatic foolproof lubrication with LUBRIVAL circulating oil system

FARVAL—
Studies in Centralized Lubrication
No. 207

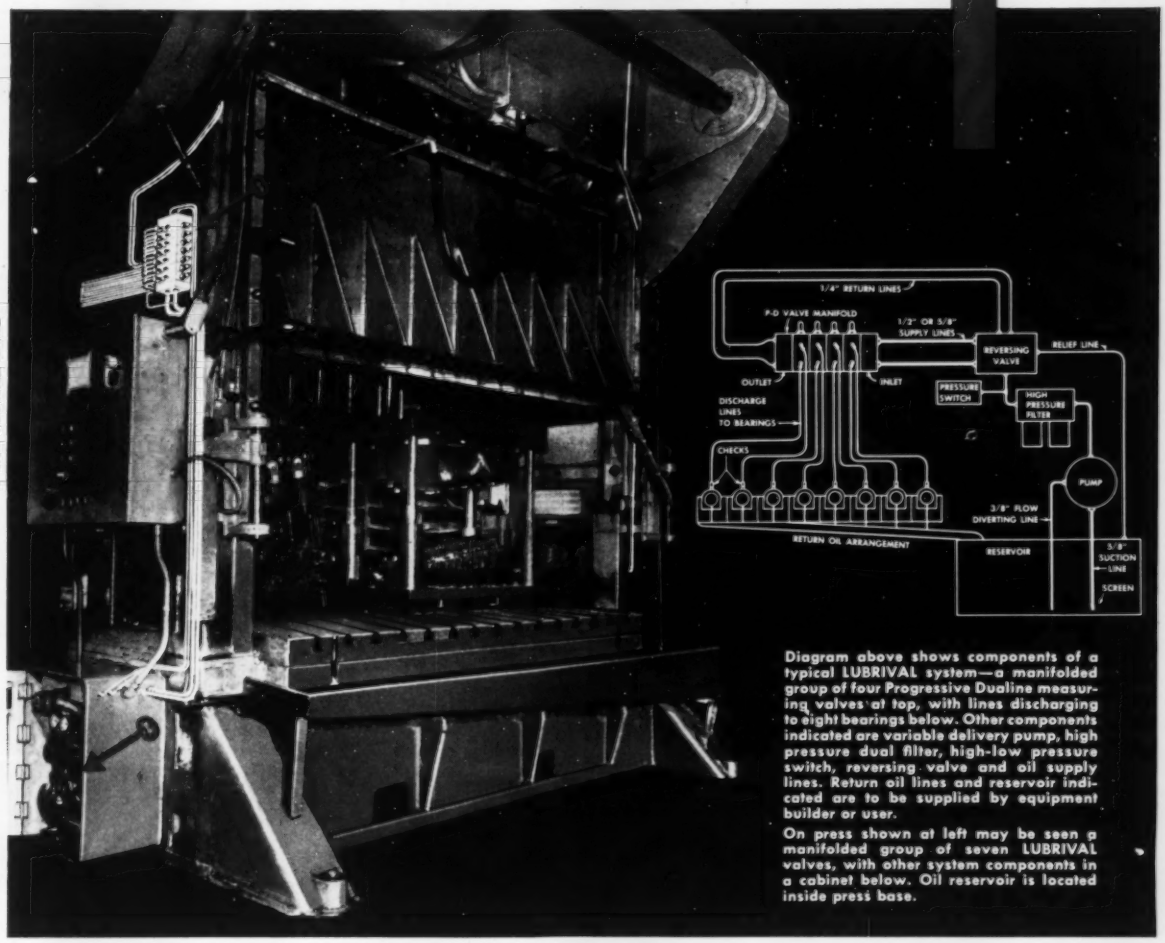


Diagram above shows components of a typical LUBRIVAL system—a manifolded group of four Progressive Dualine measuring valves at top, with lines discharging to eight bearings below. Other components indicated are variable delivery pump, high pressure dual filter, high-low pressure switch, reversing valve and oil supply lines. Return oil lines and reservoir indicated are to be supplied by equipment builder or user.

On press shown at left may be seen a manifolded group of seven LUBRIVAL valves, with other system components in a cabinet below. Oil reservoir is located inside press base.

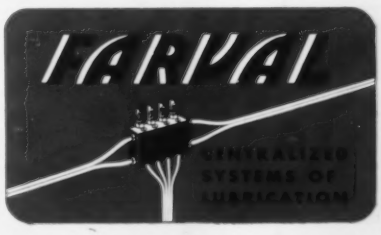
● The bearings of this 150-ton metal stamping press and others of its type are now protected by LUBRIVAL. This new Farval system for circulating oil is being installed on many varied kinds of machine tools, presses, automated machines, and other equipment calling for circulating oil lubrication.

Employing the famous Dualine principle, LUBRIVAL delivers oil to manifolded measuring valves which feed it under pressure to the bearings. Lubricant is force-fed by positive piston displacement. Flow can be regulated over a range of 10 ounces to one gallon per minute. Valves have individual sight indicators and offer a degree of installation and operational flexibility previously unknown in such devices.

The Farval representative near you will give you all details. Or write for Bulletin 70. The Farval Corporation, 3270 East 80th Street, Cleveland 4, Ohio.

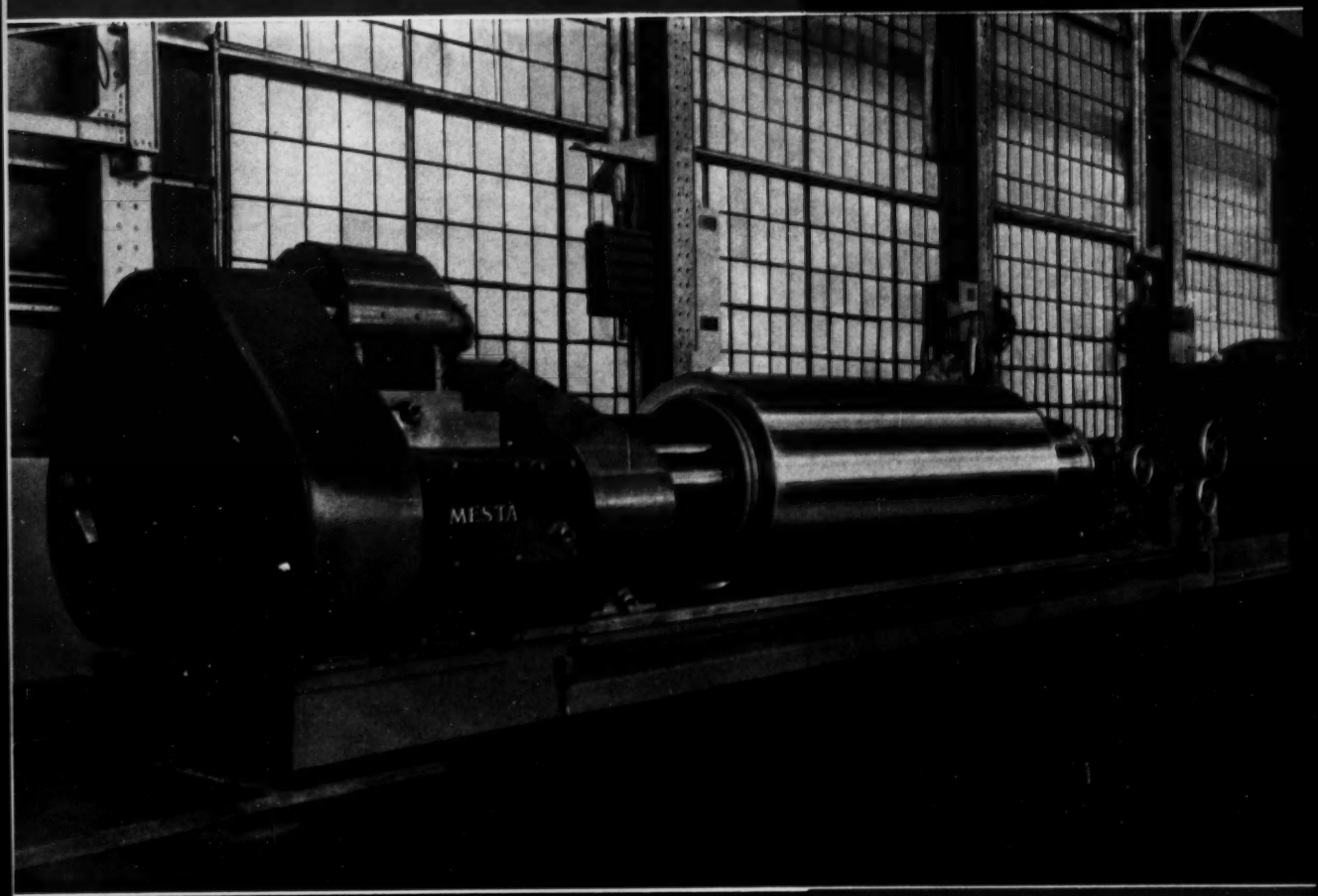
Affiliate of The Cleveland Worm & Gear Company, Industrial Worm Gearing.
In Canada: Peacock Brothers Limited.

KEYS TO ADEQUATE LUBRICATION—
Wherever you see the familiar Dualine valve manifolds, dual lubricant lines and central pumping station, you know a machine is being properly lubricated. Farval manually operated and automatic systems protect millions of bearings.



Heavy Duty ROLL GRINDERS

Designed and Built by MESTA



Mesta Heavy Duty Traveling Wheel Type Roll Grinder
Finishing a 59" x 154" Mesta Backing-Up Roll

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